2021

Reimagine | Reinvent | Reposition
Indian Statistical Institute

Report of the
4th ISI Review Committee

constituted by the

Ministry of Statistics and
Programme Implementation
Government of India

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Report of the
4th Review Committee
of the
Indian Statistical Institute
January 2020 – July 2021

FOREWORD

It is an honour and a privilege to present the report of the 4th Review Committee of the Indian Statistical Institute (ISI). This is a result of the deliberations of the committee members held over seven meetings, plus numerous discussions and consultations with diverse stakeholders.

Although the first meeting of the committee was fixed as a physical meeting on 23 March 2020, due to the onset of the first wave of the pandemic, the government advised its postponement. Subsequently all the meetings had to be held virtually, as the second wave swept the country. The pandemic is far from over, as we submit the report.

The Review Committee members felt strongly that it was important to have personal interactions with the 'workers' (as ISI likes to refer to themselves with an enlightened spirit) to get a sense of the ethos, aspirations and overall health of the Institute. It was preferable to do it by conducting physical meetings. Unfortunately, that interaction had to be done with what is the new norm now, namely virtual. Despite this, the committee was pleasantly surprised to see the intensity and vibrancy of these virtual interactions.

The committee is greatly appreciative of the glorious past of ISI, when it occupied a preeminent role in advancing the frontiers of Statistics and its breakthrough applications in diverse areas. The committee noted with some concern that despite some pockets of excellence, ISI had declined on several counts in recent times. The committee, however, is convinced that ISI has a glorious future, but only if it corrects its present in terms of making several fundamental as well as radical changes.

This is especially needed, as the context has indeed changed, be it in terms of the new needs of the new India, be it the new demands in the light of the vastly changed industrial landscape, be it the impact of the disruptive digital technologies, or be it the emergence of other competitive institutions, which did not exist at the time ISI occupied a leadership position.

So, the committee felt that ISI must reimagine, reinvent and reposition itself to regain its leadership position and remain relevant in changing times.

Einstein had famously said that you can't solve the problems with the same ideas that created them. Therefore, the committee felt that ISI requires new thinking, new ideas, and a change, that is not just incremental but radical. This radical change requires tremendous will power to take hard decisions and implement them for the ultimate good of ISI.

The committee has made very detailed recommendations that pertain to hugely scaling the reach of ISI, deepening research in frontier areas, especially in interdisciplinary research, attempting not just digitisation but attaining massive digital transformation, deepening and widening the connect with industry and government, thereby substantially increasing the level of its self-financing, moving from fragmentation to consolidation, focusing on not just individual excellence but putting its collective intelligence for participating in mega-scale national and international projects, and last but not the least, radical reforms in its governance structures, systems and processes. The report also recommends a strong support from the government on helping ISI build world-class physical and intellectual infrastructure.

This is the fourth review committee of ISI, the previous ones being in the years 1966, 1983 and 2001. The experience has been that often there has been a tendency to 'cherry pick' a few recommendations for implementation. This will not work here, since the recommendations in this Report are interconnected. Implementing one without the other will adversely affect both the speed and scale of transformation, which

is the urgent need of the hour. Therefore, we do hope that a holistic view will be taken while implementing the recommendations in the Report.

Further, there are changes, that will require resources, but there are changes, where only resourcefulness and willpower is required. Therefore, the recommendations have been divided into short-term, mid-term and long-term, depending on their ease of implementation and also criticality.

I wish to offer my profound thanks to all the eminent Review Committee members for their incredible commitment and insightful contributions that made this report possible. They all had the good of ISI at heart, and therefore there are some tough recommendations too. My sincere thanks go to numerous eminent domain experts, who contributed to the sub-committees as well as through many offline deliberations. I wish to thank the Government for not only doing me the honour by assigning the task to me, but its understanding and patience, as the pandemic took its toll, and the report got delayed.

Finally, ISI will be celebrating its century in 2031. It is a great motivating idea to dream of creating ISI@100 so that it not only counts as one of the best in India, but one of the top most in the world. The committee strongly feels that sustained implementation of the recommendations of the committee, coupled with the higher levels of aspirations and performance of the entire ISI family will make that dream come true.

Dr R A Mashelkar, FRS
Chairman
4th ISI Review Committee

Executive Summary

Indian Statistical Institute (ISI) was founded by Prasanta Chandra Mahalanobis on December 17, 1931 in the Statistical Laboratory in Presidency College (now, Presidency University) in Kolkata. It was registered as a society under the Societies Registration Act 1860 on 28/04/1932, with a General Body running the affairs of the Society. The Memorandum of Association, Regulations and Bye-laws together constitute the overall constitution based on which all operations of the Society are to be executed.

The Institute moved to its present campus in 203 Barrackpore Trunk Road in the 1950s. Envisioned as a unique institution of research and studies in Statistics as well as in related areas where Statistical theory and methods find applications, this institute commands international recognition to this day.

Through an act of Parliament, called the ISI Act 1959, the Institute was declared to be an Institute of National Importance, which would receive funds by the Government of India, and was empowered to grant degrees in Statistics and related subjects. The Institute was empowered to give degrees in Statistics, Mathematics, Quantitative Economics and Computer Science and areas related to Statistics through a subsequent modification of the ISI Act 1959 in 1995. The Governing Body of the Institute is the Council, with an eminent person, not employed in the Institute, as the Chair of the Council. The tenure of the Council is two years.

The Institute conducts several degree and diploma programs, including two undergraduate programs in Statistics and Mathematics, a number of Masters and M. Tech programs, a few diploma programs, and several PhD programs. Most of the funds for running the Institute are provided by the Government of India, though the Institute faculty obtains some amount of research funds from external sources, and the Institute earns a small percentage as internal revenue.

Under Section 9, subsection (1) of the ISI Act 1959, the Central Government constitutes Committees at certain intervals for reviewing the performance of the Institute and for making recommendation about its future course. Accordingly, the Government of India set up three Review Committees in 1966, 1983, and 2001, respectively.

The 4th Review Committee of ISI was set up through a Gazette Notification dated 28 January 2020 and its subsequent amendments. The first meeting of the Review Committee was fixed on 23 March 2020, but had to be postponed by government orders, which were issued in the wake of the first wave of the COVID-19 pandemic. This was followed by the devastating second wave, from which the nation is still slowly recovering. Thus, in spite of the best intentions of the 4th ISI Review Committee, all the meetings had to be held virtually. Despite all the constraints, the members of the 4th Review Committee spent maximum time and effort to gather an understanding of the institute, its legacy, work culture, glorious past, and its current state in terms of quality of research, relevance and impact, strengths and weaknesses, and future potential.

Based on the evidence gathered during the review period using several methods and its analysis, the 4th Review Committee is presenting its detailed report along with a set of recommendations, which if implemented in the spirit in which they were conceived, will have far-reaching and positive ramifications for the institute. The Review Committee strongly feels that it is possible to Reimagine, Reinvent and Reposition the Indian Statistical Institute, as a frontline globally recognized institute.

The Review Committee was impressed with the rich history of the Institute - the towering stalwarts who

provided a strong foundation to the Institute, the outstanding researchers who went on to make pioneering contributions in Statistics and a number of allied areas globally, the forward-looking teaching programs which ISI initiated, the first computer in India that was brought to the ISI and numerous other such achievements. Even in the present times, the Institute has a formidable lineup of some excellent researchers working in the Institute, who have brought numerous laurels to the Institute.

While appreciating the immense past contributions of ISI, the Review Committee came to the conclusion that over the past few decades, ISI has gradually lost the sheer brilliance and deep engagement with the external world that was its USP in the 60s and 70s. While the Institute continues to produce several outstanding students each year, it appears to have failed to keep pace with the changing times and has not scaled its effort to a level, where not only will it remain relevant, but also remain competitive. Presently, the Institute has individual level brilliance, but limited collective excellence and contribution. Thus, the Institute has very low presence in mega-scale national and international initiatives and projects.

The Review Committee, through interactions with multiple stakeholders, concluded that ISI continues to have a perception of uniqueness relying more on past successes than current initiatives, suffers from a lethargy to generate resources leading to an almost full reliance on government funds, and produces only a limited number of students; thus distancing itself from the changes happening in the external world.

The Review Committee, while recognizing the high potential of ISI, is convinced that the Institute urgently needs to make sincere attempts at course correction and digital transformation of almost every aspect of its functioning, in order to remain relevant and rise to the preeminent top position despite the stiff competition from the newly emerged and emerging top institutions in the country. It should scale substantially by building innovative teaching, training and application programs in Statistics, Machine Learning, Data Sciences and other contemporary areas, hugely ramp up student strength, and conduct truly original research activities in the frontier areas. ISI has to channelize a part of its effort towards proactively and aggressively reaching out to the government and the industry, in order to provide effective and high-quality solutions to their problems. In this way, not only will the scientists benefit by doing real-life translational research but also the visibility of the Institute will be enhanced significantly. Moreover, through such initiatives, ISI should strive to become much more financially independent.

The Review Committee believes that the ISI can rise to its true potential and effect a turnaround, if it can bring in certain fundamental changes, some of which are not just incremental, but truly radical in its structure, systems and processes backed up by much higher aspirational levels, from top leadership, down to every worker.

The Review Committee was alarmed to observe that the ISI is severely constrained in terms of faculty numbers, funding, infrastructure and other resources necessary to create a vibrant education, research and innovation ecosystem. It was also deeply concerned to note that accountability amongst the workers of the Institute, including the scientific workers, is low, work norms are scant, non-performance goes unpunished, and proposals on any fundamental reforms (including some suggested by the previous review committees) have so far proved difficult to implement. The Review Committee noted that despite many challenges, there are pockets of excellence in the Institute that are world class, and ISI can rise to its potential, which is huge.

The Review Committee realizes that many challenges that are holding the Institute back from attaining its true potential are internal, and could and should have been addressed by the internal leadership. That this did not happen points to some fundamental flaws in the system. The Review Committee took a deep dive into the

institutional entities, inter-relationships and mechanisms and concluded that ISI has dated governance structure that needs urgent overhaul and modernization. The Council of the Institute is bulky, with an unusually large proportion of it comprising Institute employees, almost all of whom, barring the Director and the Centre Heads, are elected. The Heads of the Scientific Divisions are elected, the representatives of the scientific and non-scientific workers to the Council are elected, the General Body members, who will be members of the council are elected, and even the Dean of Studies is elected. Elections test one's popularity, which does not necessarily translate into a measure of merit and excellence in terms of capability and academic accomplishment, the cornerstones of all great institutions. An institution as great as the ISI can ill-afford to waste time in conducting institute wide elections every two years, and all the paraphernalia that is associated with electioneering, including the almost regular lobbying that frequent elections usually bring in their wake.

Keeping these in mind, the Review Committee has made a number of recommendations that are targeted towards addressing the fundamental issues in the governance and administrative structure of the Institute. Besides these, some of the recommendations aim to rationalize the structure and focus of the scientific divisions, and distribution of scientific personnel across divisions, in order to make the scientific activities more aligned to the grand overarching objectives of the Institute. Related recommendations about creation, continuation and discontinuation of focused Centres/Units/Cells have been made to enhance productivity and to encourage inter- and cross-disciplinary research.

Any academic institution advances mainly on the strength of its faculty, scientific staff, and students and scholars. Several of the recommendations of the Review Committee aim to increase accountability of the scientific members, set tangible targets of teaching, research supervision, fund generation, etc., provide a broad mechanism of feedback, link performance (in terms of research, teaching/training, administration and revenue generation) to future career prospects/institutional support, and strengthen and create a deep connect with the alumni, who are a valuable resource for any organization.

The scientific staff of an academic institute can perform to their full potential and also outshine themselves only if they receive outstanding support from the administration. Several recommendations of the Review Committee are targeted towards rationalization of administrative staff, creation of structures for smooth conduct of research projects and engagement with the external world including the industry, efficient management of finances, adoption of digital technology and the like. Infrastructure including buildings, laboratories and computing systems need to be modernized urgently.

The Institute has to significantly expand its outreach activities with a target to become a natural go-to destination for students, industry and the government. Significant effort and resources need to be spent on brand building that has tremendous real-life value in attracting the best talents and the best projects to the Institute.

Finally, the Review Committee argues for greater autonomy to the Institute on its internal administrative matters, recruitments and the rules/procedures of recruitment, and handling the internal revenue that it generates, as long as they are within the broad guidelines of the Government of India. In terms of attracting outstanding talent to the Institute, particularly on short-term basis, the Institute should be given a special consideration to fix the remuneration and facilities at internationally competitive values. The Council, consisting of eminent and responsible persons as well as representatives of the government, should be empowered to take such decisions, without the need to thereafter seek government approval once again, as long as the total financial burden remains within reasonable limits of the sanctioned budget.

The Review Committee recognizes that it is the power of ideas together with the power of execution that

matters. Therefore, the recommendations have been broken down into categories in terms of ease of implementation as well as urgency into short, medium and long term.

The Review Committee strongly feels that as ISI reaches its centenary year in 2031, it should aim to create a new ISI@100, transitioning from the current good to the very best, to an extent that it makes an international impact and becomes one of the foremost institutes globally.

4th ISI Review Committee		
Dr. R.A. Mashelkar	Chairman	
Dr. Pronab Sen	Member	
Prof. Manindra Agrawal	Member	
Mrs. Sushama Nath	Member	
Shri Adil Zainulbhai	Member	
Prof. Anil P. Gore	Member	
Shri Dinanath Kholkar	Member	
Prof. Sanghamitra Bandyopadhyay	Ex-officio Member Director, ISI	
Shri Madan Mohan Hasija	Ex-officio Member ADG, MoSPI, dealing with ISI	
Dr. A. R. Joshi	Ex-Officio Member Officer in-charge of Dept. of Stat. & Inf. Management, RBI	
Shri Atanu Kumar Chowdhury	Secretary	

Acronyms

AI	Artificial Intelligence
AAAI	Association for the Advancement of Artificial Intelligence
AC	Academic Council
ACC	Advisory Committee of the Council
ASD	Applied Statistics Division
ASSOCHAM	Associated Chambers of Commerce and Industry
ASU	Applied Statistics Division
B. Math.	Bachelors of Mathematics
B. Stat.	Bachelor of Statistics
BE	Budgetary Estimate
BSD	Biological Sciences Division
CAG	Comptroller and Auditor General
CAGR	Compounded Annual Grown Rate
CAIML	Centre for AI and ML
CCAIR	Cell for Collaboration with Academia, Industry and Research Labs
CCSD	Computer and Communication Sciences Division
CECFEE	Centre for Research on Economics of Climate, Food, Energy and Environment
CFTI	Centrally Funded Technical Institute
CII	Confederation of Indian Industry
COLT	Conference on Learning Theory
CSIR	Council of Scientific and Industrial Research
CVPR	Computer Vision and Pattern Recognition
DAE	Department of Atomic Energy
DBT	Department of Biotechnology
DCSW	Divisional Committee of Scientific Workers
DGCI&S	Directorate General of Commercial Intelligence and Statistics
DIPAM	Department of Investment and Public Asset Management
DRTC	Document Research and Training Centre
DS	Data Science
DST	Department of Science and Technology
FCRA	Foreign Contribution (Regulation) Act
FICCI	Federation of Indian Chambers of Commerce and Industry
IASc	Indian Academy of Sciences
ICCV	International Conference on Computer Vision
ICLR	International Conference on Learning Representations
ICML	International Conference on Machine Learning
ICMR	Indian Council for Medical Research
IEEE	Institute of Electrical and Electronics Engineers
IGOT	Integrated Government Online Training
IIM	Indian Institute of Management
IISc	Indian Institute of Science
IISER	Indian Institute of Science Education and Research
IIT	Indian Institute of Technology
IJCAI	International Joint Conference on AI
INSA	Indian National Science Academy
IPR	Intellectual Property Rights
ISEC	International Statistical Educations Centre

ISI	Indian Statistical Institute
ISRO	Indian Space Research Organization
LDA	Laser Doppler Anemometer
LRU	Linguistic Research Unit
LS	laser scanner
M. Math.	Masters of Mathematics
M. Stat.	Masters of Statistics
M. Tech (CS)	Master of Technology in Computer Science
MHRD	Ministry of Human Resource Development
ML	Machine Learning
MoA	Memorandum of Association
MoD	Ministry of Defence
MoE	Ministry of Education
MoSPI	Ministry of Statistics and Programme Implementation
MoU	Memorandum of Understanding
MSME	Ministry of Micro, Small & Medium Enterprise
MSQE	Master of Science in Quantitative Economics
MSQMS	Master of Science in Quality Management Sciences
NASI	National Academy of Sciences India
NBHM	National Board for Higher Mathematics
NEP	National Education Policy
NeurIPS	Neural Information Processing Systems
NITI	National Institution for Transforming India
NLP	Natural Language Processing
PESD	Physics and Earth Sciences Division
PGDBA	Post Graduate Diploma in Business Analytics
PinC/Prof-in-Charge	Professor-in-Charge
PIV	Particle Image Velocimetry
PPEC	Policy Planning and Evaluation Committee
PPRU	Planning and Policy Research Unit
RC	Review Committee
RTI	Right to Information
SIGIR	Special Interest Group in Information Retrieval
SIGKDD	Special Interest Group in Knowledge Discovery in Data
SOSU	Sampling and Official Statistics Unit
SQC&OR	Statistical Quality Control and Operations Research
SSD	Social Sciences Division
SyMeC	Systems Medicine BioCluster
TA	Teaching Assistant
TAC	Technical Advisory Committee
TIFR	Tata institute of Fundamental Research
ToR	Terms of Reference
TSMD	Theoretical Statistics and Mathematics Divisions
TWAS	The World Academy of Sciences
UGC	University Grants Commission

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PREAMBLE

As per Section 9, subsection (1) of the ISI Act 1959, under *Review of work done, inspection of assets, etc.*, the Central Government may constitute a Committee (sometimes referred to as the Section 9(1) committee) consisting of such number of persons as it thinks fit to appoint thereto for the purpose of
(a) Reviewing the work done by the Institute and the progress made by it;
(b) Inspecting its buildings, equipment and other assets;
(c) Evaluating the work done by the Institute; and
(d) Advising the government generally on any matter, which, in the opinion of the Central Government, is of importance in connection with the work of the Institute; and the Committee, shall submit its reports thereon in such manner as the Central Government may direct.

First review committee: The First Review Committee of ISI was formed in 1966. The report by the first committee was accepted by the Institute and by the government followed by the submission of the action taken report on the recommendations to the Parliament by the government in 1968.

In the words of Professor Mahalanobis, ISI was functioning as a staff college, a research institute, a degree awarding university and a project organization. The first review committee felt the Institute had gone far beyond the confines of even the four functions mentioned above. The committee felt that the Institute would have done better if it had not unduly diversified its activities. The recommendations of the committee were implemented for the most part.

Second review committee: The Second Review Committee constituted by the government presented its report in 1983. The report of the Second Review Committee was referred to the council of the Institute by the Central Government. The Council set up an Advisory Committee of the Council (ACC) with the Chairman of the Council as Chairman and with eminent scientists as members. The ACC produced a report (1984) mentioning therein that the ACC broadly agreed with the comments of the Administration of the Institute contained in a detailed note. However, the ACC disagreed on many points with the second Review Committee. No report on the action taken on the recommendations of the second review committee appears to have been presented by the government to the Parliament.

Third review committee: The government constituted the third Review Committee under the Chairmanship of Professor C. N. R. Rao by a resolution dated 12th November 2001 (notified on 29th November) to give a report within six months. Its term was extended up to 31st July 2002 through a resolution dated 15th May (notified on 17 May). The committee gave 73 recommendations as summarized in the Chapter on “Summary of Recommendations”, some of which were implemented in the Institute. About 28% of the recommendations could not be implemented. As per information available, no action taken report seems to have been presented by the government to the Parliament.

The third review committee had focused on the need of consolidation. They had remarked on the large number of Units in the Institute, and had recommended restricting and merging. At that time, the number of Units in the seven scientific divisions stood at 35. As per the recommendation, some merging and restructuring had indeed taken place. But then, with time Units started getting created again for a variety of reasons, including initiation of new centres, and today the number of Units in seven scientific divisions stands at 40. Some other recommendations of the 3rd Review Committee, that could not be implemented in the Institute, would need a re-

visit since to the best understanding of the members of this Review Committee, many of these are still relevant, in the best interest of the Institute and reflect an external prescription for overcoming the lacunae in the ISI system.

ISI has an opportunity in the fourth review to reimagine, reinvent and reposition itself. The Institute will be completing 100 years of its journey in the next few years and it has an opportunity for creating a vision as well as a bold road map for ISI@100. Of course, that would require some fundamental changes to be made in the Institute, possibly the most difficult of which will be to change the psyche, the way of thinking of its workers[1].

The needs of ISI are to be envisaged in light of the demands of changing times, when data is driving most activities, be it in the realm of government policy making, strategic planning in industry or scientific discoveries. In present times, one is also seeing a significant increase in computing and storage resources. In the years to come, with quantum computers set to become a reality, and artificial intelligence, machine learning and data science set to redefine the way we live and the way we think, Statistics as a discipline can ill-afford to remain stagnant either in its definition or in its vision. Statistics of today has already become intricately tied to computing, and is crossing over to the boundary of machine learning and big data analytics. Statistics by its very nature also cannot exist in isolation. In a paper titled **Statistics as a Key Technology** (a phrase attributed to Ronald Fisher) by the founder P. C. Mahalanobis, The American Statistician, vol. 19, no. 2 (Apr., 1965), pp. 43-46, Taylor & Francis, there is an observation quoted verbatim here:

"Indian statisticians have a high reputation in the world and yet the statistical system in India is weak and is lagging behind in the timely flow of information required for social and economic affairs. Why?

The way of diagnosing would be to repeat here something I heard this very afternoon while having lunch with a number of distinguished former presidents of your Association. One of them, who visited India recently, had informal discussions in five or six Indian universities with graduate students who were attending courses for the master's degree in Statistics. There was, of course, much of theory and mathematical exercises. But when the students were asked what kind of data they were using, they all looked surprised and said they did not use any data at all."

In other words, the founder had envisaged that Statistics needs to have a clearly defined purpose and a concrete application area. Towards this, a number of disciplines got created in the Institute, which also changed over time, adapting to the changing times. Needless to mention, P. C. Mahalanobis and Indian Statistical Institute played a crucial role in establishing and strengthening the statistical system of the country, and spurring the development of new statistical theory and applications. The B. Stat., M. Stat. programs, initiated in the Institute in the early 1960s, remain excellent programs till this day.

The foundational principles of the Institute stressed on the development of both Statistics and the other disciplines of natural and social sciences. The objectives of the Institute therefore clearly laid out that the Institute should aspire to be a hub of teaching, training and research in Statistics. At the same time, research in natural and social sciences, which provide the real-life problems requiring the development/application of Statistical methods, was also to be undertaken in the Institute.

Thus grew Computer Science, Economics, Biological Sciences, Physics and Earth Sciences and a variety of disciplines in the Social Sciences like Linguistics, Psychology, Population Studies and Sociology, each offering interesting data-driven problems. In time, some of these disciplines like Computer Science and Economics strengthened themselves independently, some others continued at a reduced level, while some others

[1] The review committee has learnt of a legacy in ISI wherein all the employees, including faculty members, and scientific, technical and administrative staff, are called workers.

languished. It is also in this context that ISI needs to be reviewed for its purpose and focus. Should these disciplines, which bring in a level of diversity and variety to the Institute, be allowed to flourish, or should these be closed down giving in to the requirement of the larger disciplines?

Thus, this Review Committee (RC) had to deliberate carefully on defining the direction the Institute should take, considering the demands posed by the changing times, how much to diversify and how much to focus, how to strike the right balance and finally how to be aligned with the National Education Policy 2020 so that the importance of the Institute remains undiminished.

It needs to be emphasized that the National Education Policy has highlighted the need for having multi-disciplinary institutions, not those that are mono-discipline. To remain as a top tier Institute, the ISI therefore needs to remain multi-disciplinary as enshrined in its founding principles, while at the same time retaining its dominance in its areas of remarkable expertise viz., Statistics, Mathematics, Computer Science and Economics.

The RC therefore laid out the following broad principles on which it would take its activities forward:

- Revisit the objectives/purpose of ISI and determine whether these objectives continue to be relevant.
- Study the state of Statistics in India and internationally vis-à-vis that in ISI, including the role that ISI plays at the national level.
- Examine the current Research and Innovation Framework of the Institute.
- Investigate as to whether the teaching and research in the non-Statistics disciplines in ISI have utilized/integrated/ internalized Statistics in the advancements in these areas.
- Investigate ways to create a sustainable model for resource generation/availability in the Institute.
- Investigate the state of the current governance and administrative structure of the Institute, and suggest changes/improvements therein.

The RC recognizes that the Indian Statistical Institute has had a glorious past and continues to have areas of excellence. The challenge is to sustain and enhance excellence. The RC can only recommend structures, policies and resources that could be enabling factors for the Institute to attain higher levels of excellence and sustain it. While proposing the actionable recommendations, the RC has relied on its collective experience and wisdom on the practices that helped other great institutions to achieve great eminence. Finally, excellence is a journey and not a destination. It is this journey that the Institute faculty, staff and students need to make collectively. It is their dreams, their vision and their effort that will help ISI reach its true potential. That potential, the RC felt, was truly high.

Chapter 1

Terms of Reference of the Review Committee

The Ministry of Statistics and Programme Implementation, Government of India, vide Notification No. S.O. 415(E) dated 28 January 2020 in The Gazette of India, Extraordinary, PART II—Section 3—Sub-section (ii) and its subsequent amendments constituted the Review Committee for the Indian Statistical Institute. The principal notification and the subsequent amendments are enclosed as Annexure 1 to this report. The Terms of Reference (ToR) of the Review Committee were set out as follows:

(a) Review the present status of Indian Statistical Institute (ISI) in fulfillment of its objectives as an institute of national importance.
(b) Review the performance of various units/departments/divisions of the Institute during the last 10 years.
(c) Review the non-research academic programs of the Institute, including admissions, course contents, evaluation, fees, incentivization policy, etc.
(d) Review the spectrum of research activities/achievements of the Institute, including collaboration with academic institutes within and outside the country.
(e) Review the extent and intensity of interaction/collaboration with government, industry and other organizations in the country, in contributing to country's economic and social development needs as also for meeting the supply demand gap for statistical and analytical personnel.
(f) Review the overall governance and administrative structure of the institute and inter-relationships between the different governing and administrative entities in the system.
(g) Assess the adequacy of the Institute's financial resources, including grants from the government, revenue generation activities, and available physical assets – like land, buildings, equipment, for Institute's activities.
(h) Examine the need for any amendments to the Indian Statistical Institute Act, 1959 and its Memorandum of Association.
(i) In light of the review of the above aspects, recommend suitable measures, as also reorganization/restructuring, including the requirement of resources, to enable the Institute to play a more effective role in serving the economic and social development needs of the country.
(j) Report, examine and recommend on any other aspect considered relevant for effective and efficient functioning of the Institute.

Chapter 2

Methodology of Review Adopted by the Review Committee

- The first meeting of the 4th Review Committee (RC) was slated to be held on 23 March 2020. However, due to the onset of pandemic, the government issued a travel advisory to postpone that meeting, till it was safe to do so. The first wave, that lasted for an extended period, made it impossible to hold any physical meeting. Therefore, finally the method of only online meetings was followed, in view of a devastating second wave following the first wave.
- The first formal meeting of the RC was held online on 3rd December 2020 to review the functioning of ISI in fulfilling the objectives of ISI as an Institute of National Importance. The deputy director, all Professors-in-Charge, head of SQC OR Division, heads of outlying centres, heads of centres of research excellence, chief librarian and chief executive (administration & finance) were invited in the meeting to present different academic, research and administrative activities of the Institute before the members of the RC.
- The first meeting of the RC continued for the second day, 4th December 2020 but only with the members of the RC to assess the current status of the Institute based on the presentations and interactions on the meeting on 3rd December, 2020 and to chalk out next steps of actions.
- The second meeting of the RC was held online on 6th January 2021 in order to analyze the health of Statistics as an academic discipline in the Institute vis-à-vis national and international scenarios, and the need to revisit the founding principles and role of ISI in development of Statistics in the country.
- Meanwhile, to assess the functioning of the Institute in a structured fashion, and broadly in line with the Terms of Reference (ToR), the RC decided to form the following subcommittees that will provide inputs in their respective areas to the entire RC:

    - Subcommittee 1 – Research Excellence & Relevance
        - Group 1: Stat, Math, SQC&OR, Official Statistics, Computer Science
        - Group 2: Social Sciences including Economics, Sociology, Linguistics, Psychology Research, Population Studies
        - Group 3: Natural Sciences
    - Subcommittee 2 – Teaching & Training
    - Subcommittee 3 – Resources
    - Subcommittee 4 – Governance

    The constitution of the subcommittees is provided in Annexure 2 to this report. The present report is based on the recommendations given by the subcommittees, and the final view on them taken by the RC after collective deliberations and broad consensus.

- The third meeting of the RC was held online on May 13, 2021 to discuss the inputs of the different subcommittees constituted by the RC.

- The fourth meeting of the RC was organized online on June 4 and June 5, 2021 to meet all faculty members of the seven scientific divisions and also to meet the representatives of the ISI Workers Organization (ISIWO).
- The fifth meeting of the RC was held on June 19, 2021, exclusively with the President of the ISI General Body and the Chairman of the ISI Governing Council.
- Written views were sought and some were received from the external members of the ISI Governing Council.
- A draft report was then circulated to all the members for their feedback and suggestions.
- The sixth and seventh meetings were conducted on July 10, 2021 and July 21, 2021, respectively, to finalize the report.
- While the RC discussion were in progress, some recommendations that could be initiated without much external intervention were acted upon with the active help from some RC and/or subcommittee members. This included making efforts to create a deep connect with the alumni and initiation of dialogue with appropriate organizations for development of online academic content culminating with the signing of an agreement with an online course provider.

Chapter 3

Analysis of the Performance of ISI by the Review Committee

The objectives of the Indian Statistical Institute are:

1. *to promote the study and dissemination of knowledge of Statistics, to develop statistical theory and methods, and their use in research and practical applications generally, with special reference to problems of planning of national development and social welfare.*
2. *to undertake research in various fields of natural and social sciences, with a view to the mutual development of Statistics and these sciences.*
3. *to provide for, and undertake, the collection of information, investigations, projects and operational research for purposes of planning and the improvement of efficiency of management and productions.*
4. *to undertake any other ancillary activities in fulfillment of the objectives 1, 2 and 3 above.*

The RC has the following observations:

- The objectives of the Institute as laid out in the Memorandum of Association are still relevant even in the current times of data driven science.
- The committee acknowledges that ISI is a remarkable institute, which did its best to stay relevant despite the changing demands. Over time, with changes in faculty profile and their interests, some change inevitably crept in that led to a shift in focus of the Institute. These need to be discussed at length.
- In Statistics, the central role that the Institute was expected to play, almost like that of a mother Institution, has diminished over the years.
- At the same time, over the years, responding to the changing times, the Institute has focused on studies in Mathematics, Quantitative Economics and Computer Science, besides evidently continuing to develop theory and applications of, and providing training in, Statistics. These three disciplines have become strong in the Institute, and their academic and research programs are widely acclaimed.
- Besides these areas where the Institute is empowered to give degrees, there are other disciplines in existence in reasonable numbers viz., biological sciences, geological sciences and physics, and still other areas where the number of faculty members have dwindled close to one or two, like in several disciplines of social sciences and biological anthropology.
- The Institute is spread over many locations. In terms of scientific disciplines also, there is a lot of heterogeneity within the divisions, and there are a large number of small units. Structurally, the Institute seems to be heavily fragmented.
- The Institute is heavily challenged by the restriction imposed on it in terms of the cap in the faculty strength. The Institutes is also heavily resource constrained. Infrastructure is also strained.
- Despite this, the Institute has an enviable record of producing some individual excellence, and continues to churn out well-trained individuals, though in limited numbers.
- The Institute now needs to scale up its reach, deepen its research activities in frontier areas, adopt large-

scale digitization and carry out digital transformation of its processes for enhanced efficiency and effectiveness.

3.1 Research Excellence and Relevance

The general observations on research excellence and relevance may be summarized as follows:

1. The primary focus of the ISI has been on theoretical research and the Institute has been generating excellent publications and citations in many of the areas, if not most.
2. The faculty strength in the field of Statistics is diminishing over the years. Shortage of good faculty applications in the field of Statistics was one of the reasons of reducing strength of faculty in this discipline.
3. Moreover, the recruitment processes needed to be streamlined, as it presently is rather time consuming.
4. There are research projects in this Institute, which are classified in nature. The faculty members involved in these projects have to operate under certain restrictions.
5. With regard to health care, ISI is already doing a lot of research from different perspectives. A cluster initiative dealing with computational studies of oral and cervical cancer is in operation in the Institute.
6. ISI is also actively providing scientific, technical and training support to various wings of the government, including in Statistics. However, the Institute (especially the Delhi campus) needs to significantly expand this function further and strengthen links with key government bodies.
7. Many of the faculty members have been included among the world's top 2% scientists in what has now come to be called the Stanford List. This study published in PLoS Biology in 2020 [*PLoS Biol 18(10): e3000918, 2020*], and led by a scientist from Stanford University, has listed out the top 2% most-cited scientists across the globe based on a measure that considers citations, h-index, co-authorship-adjusted hm-index, citations to papers in different authorship positions, and a composite indicator. Updated databases and code are freely available in Mendeley (https://dx.doi.org/10.17632/btchxktzyw).
8. Given the strengths that ISI has in Statistics, data science and AI, it should be playing a more active and leadership role in national data policy and national AI policy and various regulations that would be evolved in this context. However, the RC has not seen much of involvement of ISI in this context. This needs to be adequately addressed in future.
9. The Institute should take the opportunity to use their expertise in AI and Data Science to initiate various short-term courses for the industry to bridge the gap between the demand and supply of skilled personnel in these fields. The footprint of ISI in Artificial Intelligence and Data Science should be more significantly visible. Its presence is abysmally low in flagship data science conferences such as NeurIPS, ICML, ICLR, COLT, CVPR, ICCV, SIGKDD, SIGIR, AAAI, IJCAI, etc. These conferences are highly competitive and publishing papers here would improve the international visibility of ISI. Digital technology must be leveraged to increase the reach not incrementally, but by orders of magnitude.
10. Industry collaboration is weak although its importance can hardly be overemphasized since the students, particularly those in Statistics, need to engage in the problems faced by the industry. Lively work often happens in start-ups. The Institute must reach out to the industry and embrace start-up culture much more aggressively to find a translational outlet of their research. One clear advantage of campuses in Bengaluru, Chennai, Delhi etc. is the nearness to industry. This makes interactions easier. Hence attempts must be made to use each campus to reach out to industry around that campus, more effectively.
11. Number of externally funded projects is small. It was noted that the research being conducted in ISI was primarily of a theoretical nature. Further there was a lack of collaboration across disciplines and divisions that hindered attracting a lot of external grants and large projects of more than a critical size. Nevertheless, the number of externally funded projects and consultancy activities undertaken by the faculty members is on the rise from a small base.

3.2 Academic Programs

1. The conventional academic program like Master of Science in Quality Management Sciences (MSQMS) is diminishing in importance. The way of achieving quality in this digital world is different, and people from different backgrounds are moving in this field. Perhaps need for a traditional QMS degree will slowly become irrelevant, unless ramped up with digital transformation on content and style. Thus, significant digital transformation in content and style is needed for MSQMS, also possibly for most other academic programs in the Institute, in order to remain relevant and/or attractive in the long-run.
2. It would be relevant to look into locations where similar courses are being offered. It appears that ISI is not utilizing technology and digital platform enough, in order to produce more within the given faculty cap. Such advancements may also help to attract faculties and students across the world. However, the pandemic has made it clear that in many disciplines, such as many that exist in ISI, it is possible to use digital platform to offer courses to the students.
3. The importance of the courses available in ISI at the national level needs deliberation. In particular, there is a need to look at what ISI is contributing in areas like health and education, and how the Institute is placed in Big Data studies. Some well-defined metrics and trend analysis are needed to judge the performance vis-à-vis the best national and international institutions.
4. The total budget to student ratio of about Rs. 30 Lakhs per annum per student is much larger compared to many similar organizations. This stresses on the need to increase the student strength. The recommendations of RC on this are included in Section 6.5, ***Recommendation V – Teaching Activities***.
5. The Institute is producing a small number of PhDs. Although recently the number of PhDs being produced may be increasing, it is far less than desirable. A significant proportion of the faculty has not graduated a single PhD in the last ten years. The reason for the same must be identified. Is it lack of willingness of the faculty, resource constraint, or fund unavailability?
6. There are scholars who work full time in ISI but get PhD from other Universities. This is undesirable. The reason seems to be the constraint imposed by the ISI Act.
7. The definition of teaching at ISI needs a relook. The diverse nature of the institute has forced it to define teaching in a broad sense. There are some disciplines that have active teaching programs. However, teaching programs is not possible in some other disciplines of the institute because of the constraints in the ISI Act.
8. Increasing the student strength has infrastructural limitations. In particular the size of the classrooms is a major concern. It was noted that the institute is in the process of addressing some of these issues.
9. One concern is that many faculty members are unwilling to teach, or unwilling to teach beyond their subject of expertise. All faculty members should be able to teach at least a few of the core subjects which may not be in their research area.
10. Teaching load of the faculty, even in the divisions where teaching program exists, is on the lower side, less than one-course a semester on an average. On top of that, not many faculty members are guiding students and/or applying for external grants. So overall, the teaching load on the faculty members is on the lower side compared to other similar Institutes.
11. Given the cap on the faculty strength, ISI should look at other avenues to get teachers, like guest teachers, visiting faculty, adjunct faculty, faculty on contract. It is understood that ISI already utilizes the services of guest teachers and visiting faculty.
12. There is a need to study whether the faculty members, who were spread out over Units/Divisions/Centres/ geographical locations work in silos or collaborate with each other.
13. It was clarified that class at one center being attended in the virtual mode from another center are not unusual in ISI. This may be a way of operating with increased student strength but with limited faculty.
14. It was also clarified that there is no restriction on faculty collaborating across different

units/divisions/locations and such collaborations happened in the normal course.

3.3 Institutional Resources

3.3.1 Human Resources

1. There is a concern on the large number of RTIs, complaints and court cases that the Institute has to handle. If internal members filed most of these, then the cause of their grievance needs to be looked into.
2. The institute has mechanisms in place to address the internal grievances. These will have to be revisited to intensify the two-way communication, speed of response, greater level of transparency and trust. Digital tools will have to be used for online dialogue rather than meetings stretched over months.
3. Requirement of space needs to be justified in view of the present era of digitization.
4. There are certain funding opportunities from government from which ISI is excluded. These need to be looked into and ways found to entitle ISI to avail of these funding opportunities. All the skills of ISI have to be used for national good, after all.
5. Re-structuring and reforms are indeed urgently required. However, it was important to first conduct a detailed quantitative study of the institute activities, possibly in comparison with other Institutes in the country, to understand how ISI is positioned.
6. The requirement of having large number units under each scientific division needs a revisit along with the role that they play, and the reasons of their creation. Whether the units were creating silos that could be a hindrance in attaining academic excellence needs to be assessed. The units are typically created around more specialized areas of research under the broad discipline of the division. In other cases, like Stat-Math, the different geographic locations enforced creation of different units for administrative convenience. Collaboration across units is common. However, the unit structure might need to be looked into for possible rationalization.
7. ISI may need Statisticians to collaborate with other sciences, and thus it should recruit personnel who are working in such interdisciplinary areas.

3.3.2 Funding – Source and Management

The level of external resources that the Institute generates is far below expectation. The plan of generating external resources and coordination/ partnership with the industry for utilizing CSR funds need to be discussed. The Institute has primarily relied on government funds. The Institute is focusing on revenue generation in recent times, realizing that government funds would become progressively difficult to come by. Presently 8%-10% of the funds flow from external sources, which include external research and consultancy grants. Although the institute has already started exploring ways of increasing external funding, it also requires a change in mindset of the Institute functionaries. Concerted effort is lacking as of now. Moreover, the alumni connect is very limited in the Institute as compared to most other centrally funded technical institutions. The alumni are a valuable resource for any organization. Because of emotional ties, they often go out of their ways for the development of their alma mater, be it by being brand ambassadors, providing intellectual inputs, giving different service and contributing financially. The issues of alumni connect need some deliberation.

3.4 Governance and Administrative Structures

The Institute is a registered society, run by a General Body with an eminent person as its President. However, since the Institute, through an Act of Parliament was declared to be an Institute of National Importance, and is receiving funding by the Central Government, the Institute needs to adhere to the regulations of the Central Government as applicable to autonomous bodies.

The Council is the governing board of the Institute that is headed by an eminent person as its Chairman. The tenure of the Council is for two years. The Director is the Chief Executive Officer of the Institute, who has to operate within the ambit of the Council. The Director is assisted by at most two Deputy Directors.

Academically, the Institute has seven divisions, each headed by a Professor-in-Charge/Head, SQC&OR. These heads of divisions are responsible to the Director. The Dean of Studies is the overall in-charge of all the academic programs of the Institute. The Dean is assisted by several Associate Deans and students-in-charges. The Dean is also responsible to the Director for conduct of the academic programs. The In-charges/Head SQC&OR as well as the Dean are all elected every two years. The Regulations state as follows:

"The Council shall appoint a person as Professor-in-Charge of a Scientific Division provided he/she has been selected from among the categories of Associate Professor, Professor and Distinguished Scientist or their equivalents by three-fourths majority of all members of the concerned Divisional Committee of Scientific Workers (DCSW) and provided, further that he/she is not selected for two consecutive terms."

Although the regulation states that the person is *selected*, yet the process of 'selection' is laid down as 'election' by three-fourths majority of all scientific members of the division. Again, the Regulations outlines that the Dean of Studies shall be appointed by the Council for a period of two years from a panel of three names in the categories of Associate Professor and other scientific workers of equivalent rank and above engaged in teaching, suggested by the Academic Council (AC). However, the way that the AC creates a panel of three names is through election. Besides these several other elections are prevalent in the Institute.

The Chief Executive (Administration and Finance) heads the administrative wing of the Institute, who is assisted by several Deputy Chief Executives.

The Institute has four Centres, namely in Delhi, Bengaluru, Chennai and Tezpur. A Centre Head is in-charge of each Centre, who is selected by a Council appointed committee consisting of the Chairman of the Council, Director, and an external expert decided by the Council. The tenure of the position of the Head is four years.

Chapter 4

Statistics as an Academic Discipline: ISI vis-à-vis National and International Levels

The RC, after the very first meeting, felt the need to review the state of Statistics in ISI, vis-à-vis the national and the international scenario. Through analysis of a variety of data, it emerged that interest in Statistics and related courses is increasing worldwide. For example, the IBM Data Science course, Methods and Statistics in Social Science and Statistics with R in Coursera had 710, 340 and 290 takers, while the top three Math courses in Coursera had 320, 290 and 240 takers as on January 3, 2021.

Additionally, the following observations were made:

- Although interest in Statistics is increasing as the job market has improved, most students trained in Statistics, do not continue in academics.
- Quality of Statistics teaching in most universities in India is not up to the mark, with the main lacunae being inability to handle data, not knowing the real-life problems to apply the theoretical methods to, and inadequate exposure to applications from diverse disciplines.

The number of colleges awarding bachelor's degree in Statistics is even now abysmally low as compared to the numbers offering equivalent degrees in Math, Physics, Computer Science and Economics. It is admitted that Statistics is not as old a discipline as Math, Physics and Economics. But compared to Computer Science, it seems to be almost of the same age.

In ISI, the maximum B. Stat. intake is 50 or 55, while the actual class sizes are smaller. In contrast in some IITs, the maximum intake of most popular courses is above 100. The undergraduate degree program in IISc has an intake of about 120. However, it is to be noted that ISI also runs a B. Math. course, and together the intake becomes about 100. The M. Stat. class size in ISI is about 80, as most of the B. Stat. carry on into M. Stat. This is a reasonably good class size as of now. The number of PhDs in Statistics on the other hand is very low, and needs quick rectification within 4-5 years. The RC is given to understand that this lacuna is likely to be addressed soon with the intake in Statistics PhD programs seeing a rise in recent years.

It was noted that Statistics in the University System in India had started quite early on:

- University of Madras - 1934-36,
- Calcutta University - 1941,
- Bombay University - 1948,
- Pune University - 1953

Thus, it should have been easier to expose students to diverse application disciplines existing in the Universities. This does not seem to have happened to the desired extent because of a variety of reasons. It was observed that in ISI, a large number (more than 90) of faculty members have a Masters' degree in Statistics. However, more than half of them decided to pursue Mathematics, Probability, Cryptology, Econometrics, etc.

While there is nothing wrong in this, this may point to a reason why there seems to be dearth of enough number of highly skilled statisticians in the country to serve the academia and the industry.

All this further brings home the point that despite playing an important role in the country's statistical landscape for more than 90 years by conducting teaching and training programs in Statistics throughout the year, ISI needs to scale up the activities further for meeting the ever-increasing demand for trained statisticians. In particular, ISI needs to create programs like "Training the Trainers" and it needs to embrace digital technology in a big way to multiply its reach. Nevertheless, a caveat was sounded that while ISI would need to ramp up its activities and take a role of a mother Institute in Statistics, there is a need for a collective national will for improving the state of Statistics in the country, and the active participation of the Universities in this endeavor.

The focus then shifted to checking out the state of Statistics in ISI. An important and interesting observation that was made in course of the deliberations of the RC can be framed in terms of the question "Who is a Statistician?" There seemed to be no single and unique definition, the two ends of the spectrum being the following:

- An exclusive definition, which eliminated all except those who have a PhD and continue doing research in Statistics being called Statisticians. This eliminates those who either do not have a PhD in Statistics or carry out research/applications in some other well-defined field like cryptology, machine learning, demography, econometrics, etc.
- Then there is an inclusive definition, which includes those who have training in Statistics and/or develop/use statistical techniques substantially in a variety of real-life application domains.

The committee generally felt that the definition should be kept broad as any narrow outlook could be damaging. Nevertheless, an analysis was done to figure out how the number and percentage of Statisticians in the ISI, under a variety of definitions, varied over the last 20 years. Two graphs, labeled Fig. 1 and Fig. 2, are provided below, with the meaning in the legend first explained in Table 1.

As can be seen from the Fig. 1, from 2000 to 2020 almost all the numbers have come down, with a significant decrease observed in the numbers of the largest composite group of #Stat(PhD&Res)+Prob (Stat)+ApplStat(NonSQC)+SQC, which reduced from 124 to 92. Note that this analysis was done over a long period of time, and may have some minor discrepancies, but we believe the overall picture would not change much. A closer look revealed that the largest component of this reduction was due to the depletion in the strength of the SQC&OR division from 64 to 42.

The same is also reflected in the reduction in percentage strength of the SQC&OR division as can be seen from Fig. 2. The percentages in the other sections remaining very similar, sometimes with minor increments. However, it was evident that even though percentages remained more or less unchanged over the 20-year period, the decrease in the absolute number of Statisticians has hurt the Institute. An additional restriction of the cap of the faculty strength to the strength existing as on Nov. 2013, that turned out to be 273, further hurt the possibilities of increasing the number of recruitments in Statistics dramatically.

It was noted that a restriction on recruitments in the Institute, including in the Assistant Professor level, was imposed because the Institute was found not to be adhering to the provisions of the reservation rules. Naturally, once the restrictions were lifted, the Institute has been reserving adequate number of vacancies for the reserved categories. This is evident even from the currently published advertisement.

Finally, it was pointed out that the number of suitable, high quality, Statistics faculty applications being received in the Institute was low compared to that received in several other disciplines, and more so in the

reserved categories. Moreover, with lack of clarity in recruiting foreign faculty and OCIs, situation has become further stressed. Although the Institute seems to be trying to rectify the situation (the currently online 2021 faculty advertisement clearly states "At least 8 positions [for a minimum of 22 vacancies advertised] will be for applicants with background in Statistics (that is, having a PhD in Statistics and/or PhD thesis topic is on Statistics) and related areas (including Probability Theory)", more effort is in order to attract the best candidates to ISI.

The RC also feels that Institute should make a direct effort to recruit faculty with Statistics background, working in the domains of biological sciences, computer science, economics, demography, linguistics etc, disciplines already existing in ISI. One reason that sufficient collaborative work has not happened in the Institute seems to be the fact that the recruitments never focussed on encouraging such cross-disciplinary expertise – relying entirely on collaborative work just happening on its own. Unless the recruitments become more focussed on these blurred areas, the objective of inter-disciplinary work with Natural and Social Sciences will never be met. Even the present 2021 advertisement, referred to earlier, does not address this issue.

Finally, the RC focused on the state of Statistics in ISI in the national and international contexts. In the national scenario, the number of faculty members in the different Statistics department as can be seen from the Fig. 3 (or equivalent in their Mathematics departments) in the Universities and some IITs was not encouraging (that data pertains to towards the end of 2020 – again though enough care was taken to be as accurate as possible, minor discrepancies may be present). Several IITs and IISc still do not have Statistics departments.

Fig. 4 shows the faculty numbers in different top departments around the world. For many foreign Universities, the numbers depicted include research, teaching, joint, adjunct, visiting and other categories of faculty. The numbers in ISI depict the regular faculty, since the other categories, if at all there are any, are very few. Again, the data pertains to the end of 2020. Though enough care was taken to be as accurate as possible, minor discrepancies may be present. As can be observed from Figs. 3 and 4, the major problem in ISI is that the number of Statistics faculty is spread across the Institute, with the numbers being very dismal in Bengaluru, Delhi and Chennai.

A quick check on the Statistics publication status of ISI vis-à-vis that from the top Statistics departments in the country and abroad was attempted using Scopus. However, narrowing down to Statistics was not possible. It was possible to do a comparative analysis for Mathematical Sciences, which included Statistics and Probability, besides a host of other areas of the broader science. In this respect, the performance of ISI seems to be very good in the country as is evident from Fig. 5 for a period 2011-2020.

The number of citations of Mathematical Sciences publications from ISI, as compared to three other reputed institutions in India having the largest number of publications is also better as is evident from Fig. 6. Table 2 shows the publication and citation information as obtained from Scopus in the area of Mathematical Sciences for some Universities around the world that have Mathematics and Statistics departments. When compared with the publication metrics from these departments, the situation in ISI needs quite a bit to be desired.
As already mentioned, the comparison done based on Scopus is for Mathematical Sciences that includes many disciplines besides Mathematics and Statistics. These conclusions may or may not hold for Statistics, as the specific study could not be carried out.

Information about placement of students (of all disciplines), as received from the Institute, is depicted in Figs. 7, 8 and 9. As can be seen, a substantial percentage of the ISI students go for higher education. In fact, the

impression gained is that these students are selected in some of the best departments around the world (the largest percentage as expected goes to the US) and in India. Such a high percentage of students going into higher education seems to be rare in India, adequately indicating that the level of education they receive at ISI is at a high level, motivating them to seek further knowledge. The financial sector absorbs a very large percentage of the students opting to go to industry. Again, the impression gained is that the salary package of these students is comparable to the average salary package in the top institutions of the country. Also, all the students who choose not to pursue higher education get adequately placed.

ISI alumni in academia are faculty of some of the best Statistics departments/groups all over the globe. A quick search revealed the information in Table 3. All information is as in end 2020. Thus, overall, it is evident that despite all the constraints, ISI has played and continues to play an important role in the academic landscape in the country and internationally.

Table 1: Explaining the Legend in Figs. 1 and 2

1.	#Faculty with Master's in Stat: Number of faculty with a Master's degree in Statistics
2.	%Faculty Master's Stat: Percentage of faculty with a Master's degree in Statistics
3.	#Stat(PhD&Res): Number of faculty with PhD in Statistics and continuing research in Statistics
4.	%Stat(PhD&Res): Point 3 in terms of percentage
5.	#Prob (Stat): Statisticians who have moved into Probability research
6.	#ApplStat(NonSQC): Those who are primarily working in applications of Statistics to a specific application domain those in Cryptology, population studies etc. and would be excluded under the Exclusive definition, but would be included under the inclusive definition of Statistics. This does NOT include those working primarily on application of statistical methods to industrial problem as prevalent in the SQC&OR Division.
7.	%ApplStat(NonSQC): Point 6 in terms of percentage
8.	#Stat(PhD&Res)+ApplStat(NonSQC): Number of faculty in groups 3 and 6 above.
9.	%Stat(PhD&Res)+ApplStat(NonSQC): Point 8 in terms of percentage
10.	#Stat(PhD&Res)+Prob(Stat): Number of faculty in groups 3 and 5 above
11.	%Stat(PhD&Res)+Prob(Stat): Point 10 in terms of percentage
12.	#Stat(PhD&Res)+Prob (Stat)+ApplStat(NonSQC): Number of faculty in groups 3, 5 and 6
13.	%Stat(PhD&Res)+Prob (Stat)+ApplStat(NonSQC): Point 12 in terms of percentage
14.	#Stat(PhD&Res)+Prob (Stat)+ApplStat(NonSQC)+SQC: Number of faculty in groups 3, 5, 6 and industrial practitioners in SQC
15.	%Stat(PhD&Res)+Prob (Stat)+ApplStat(NonSQC)+SQC: Point 14 in terms of percentage

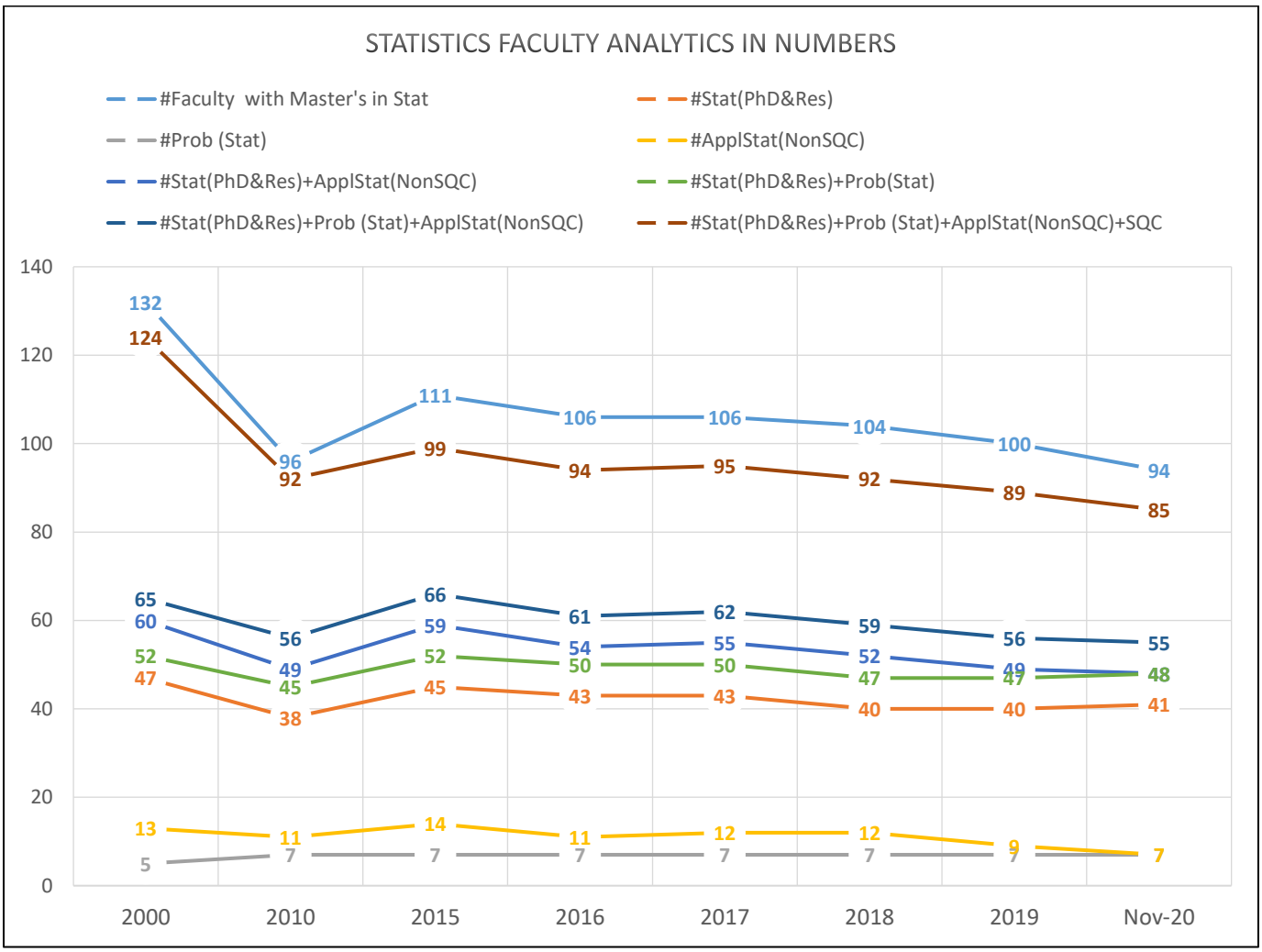

Fig. 1: Statistics Faculty Analytics in Numbers

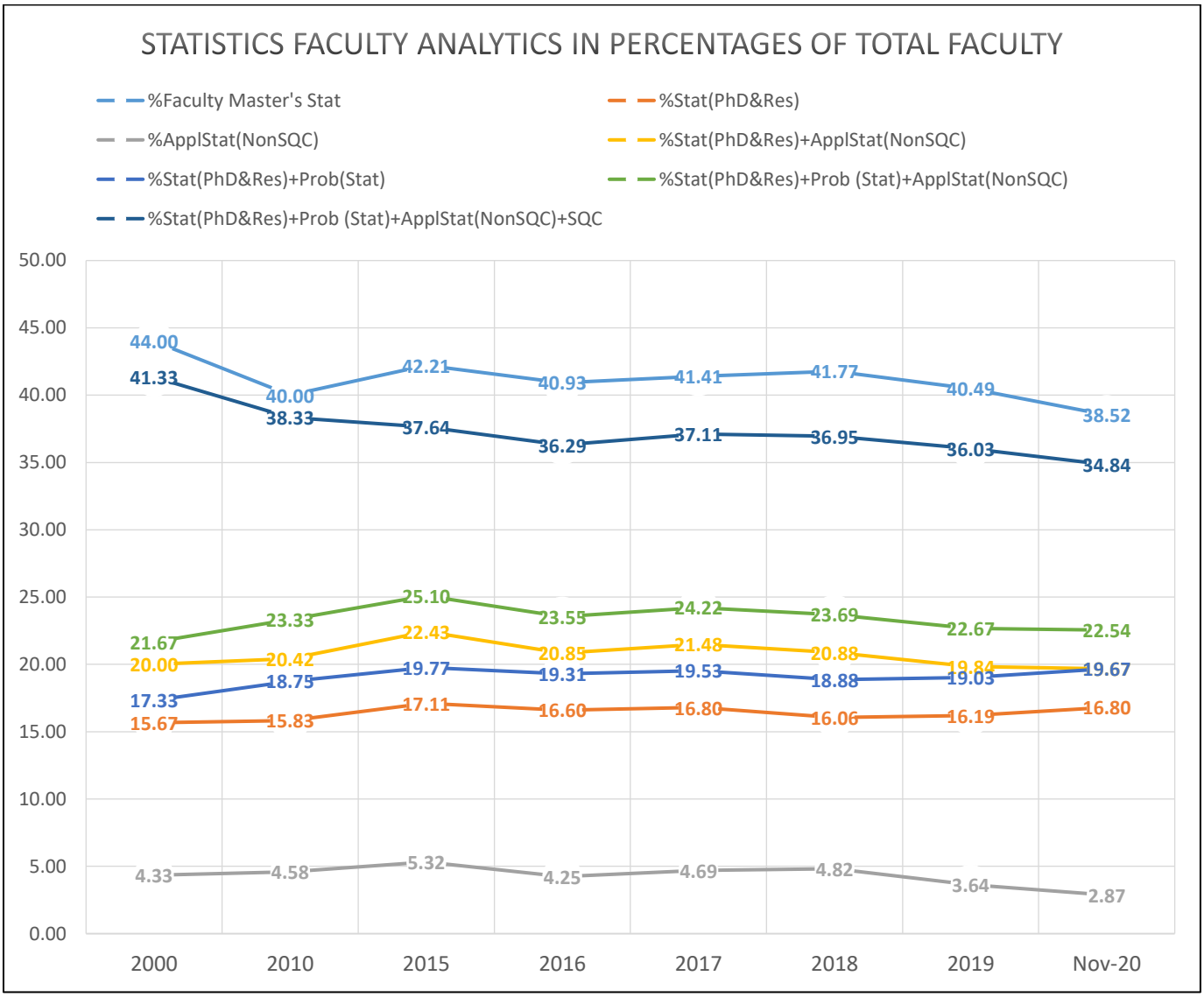

Fig. 2: Statistics Faculty Analytics in Numbers

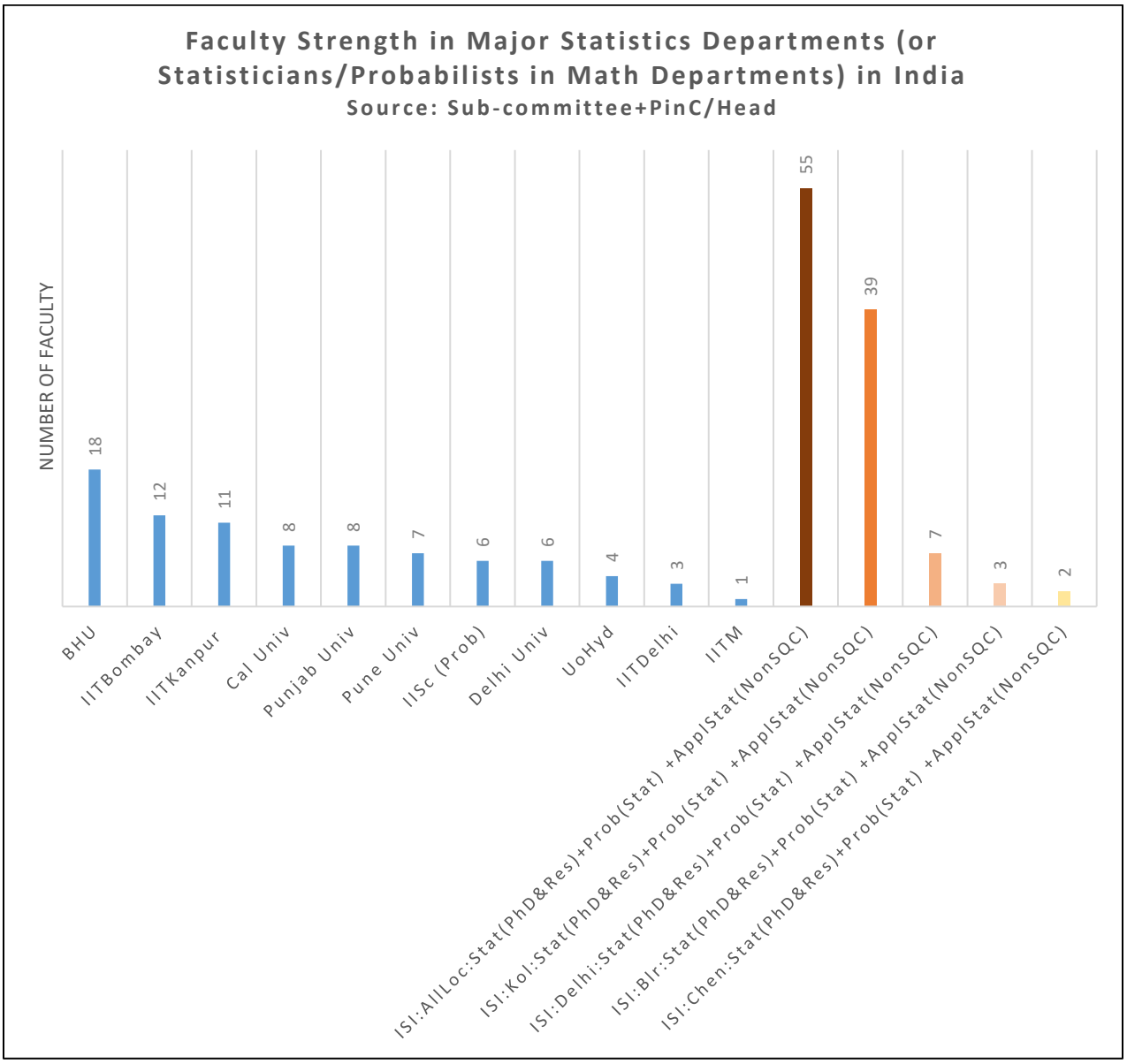

Fig. 3: Comparative Faculty Strengths in Statistics in Some Institutions in India (Nov. 2020)

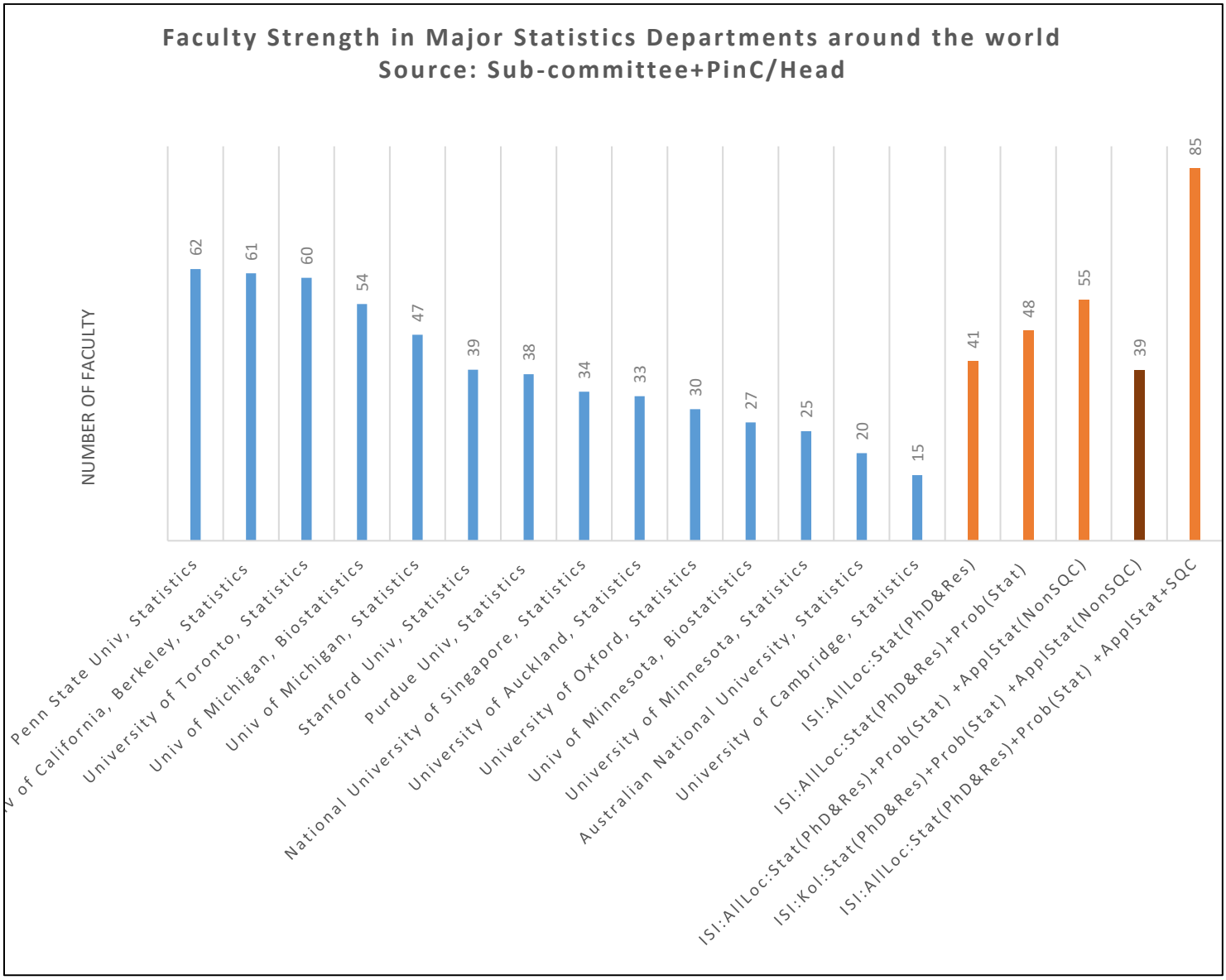

Fig. 4: Comparative Faculty Strengths in Statistics in Some Institutions Internationally (Nov. 2020)

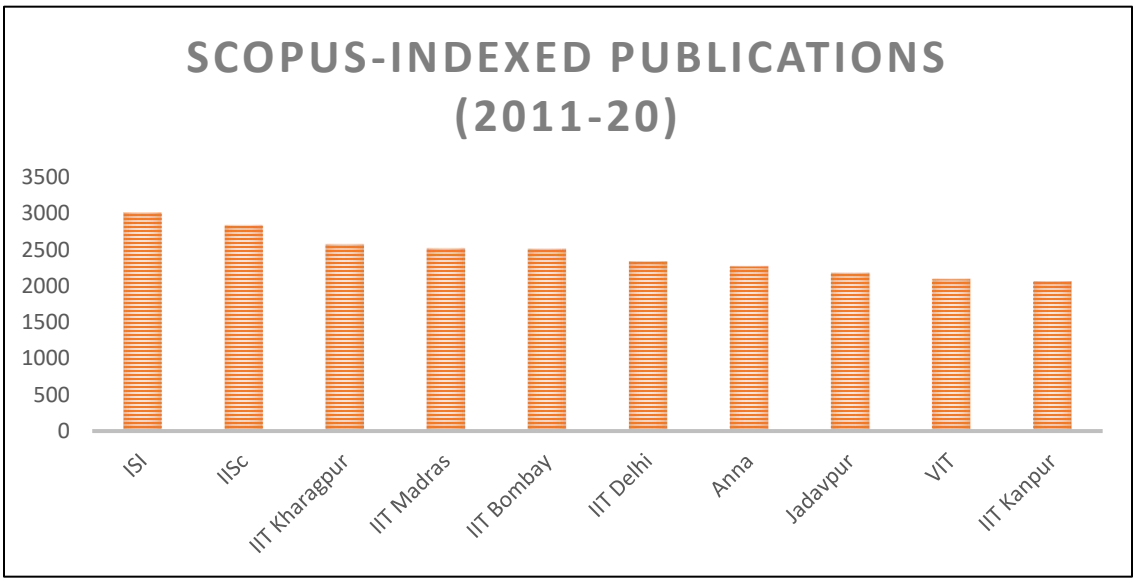

Fig. 5: Comparison of Number of Publications in Mathematical Sciences for Some Top Performing Institutions in India (Scopus)

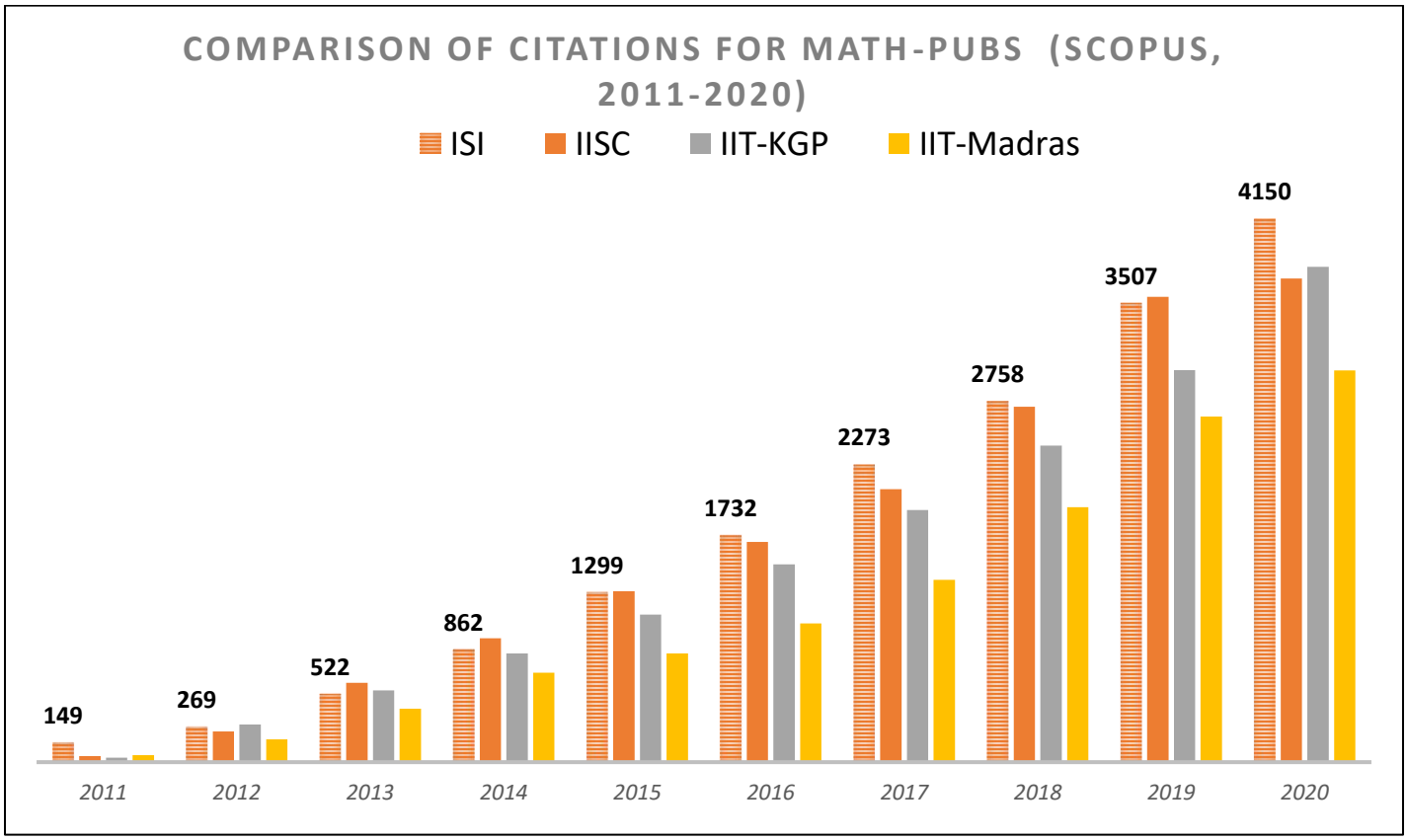

Fig. 6: Comparison of Citations in Mathematical Sciences for Some Institutions in India (Scopus)

Table 2: CITATION DATA IN MATHEMATICAL SCIENCES OF A FEW FOREIGN UNIVERSITIES (SCOPUS 2011-2020)

YEAR	UC, Santa Barbara	Michigan State Univ	Harvard Univ	ISI	Stanford Univ	UC-Berkeley	Oxford Univ	Penn-State
Total Citations	35386	36944	60225	17521	112423	106918	103529	51014
Total Pubs	2705	3465	3565	3004	6882	7243	8382	5284
Average Citation	13.08	10.66	16.89	5.83	16.34	14.76	12.35	9.65
h-index	71	69	97	46	128	118	108	78
Faculty Strength	19 (Stat) + 40 (Math)	34 (Stat) + 91 (Math)	18 (Stat) + 21 (Math)	55(Stat+ Prob+A ppl)+>4 5 (Math)		33 (Stat) + 60 (Math)		

(Source: Scopus, search with "Mathematical Sciences" – that includes several disciplines besides Math & Stat)

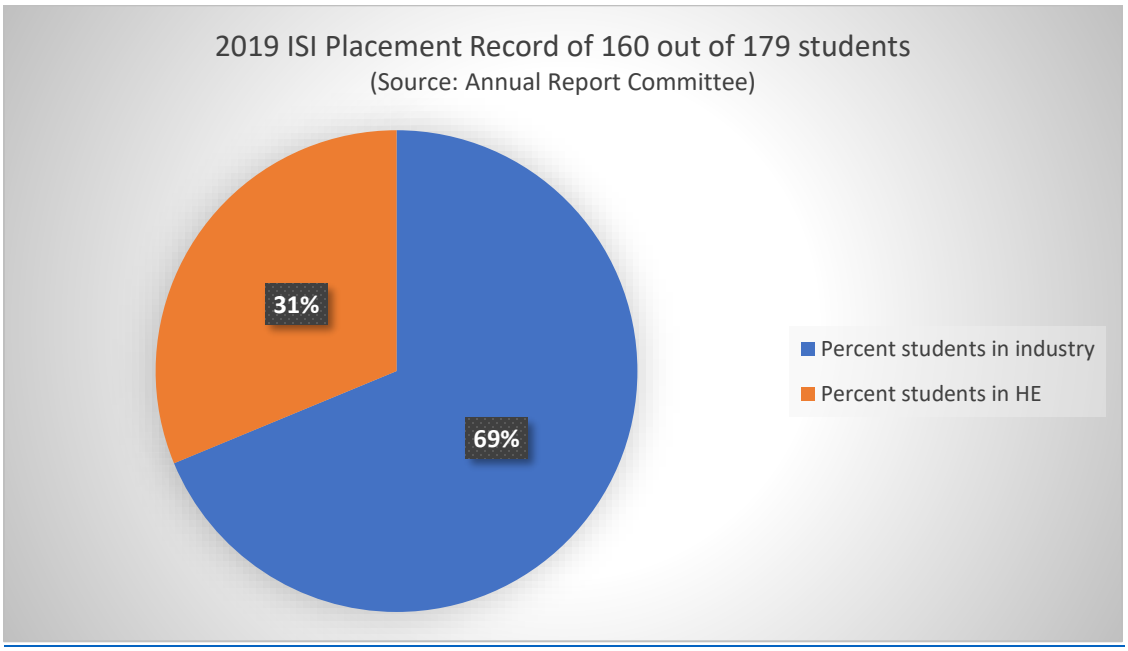
2019 ISI Placement Record of 160 out of 179 students
(Source: Annual Report Committee)
31%
69%
Percent students in industry
Percent students in HE

Fig. 7: Placement Record in ISI (2019)

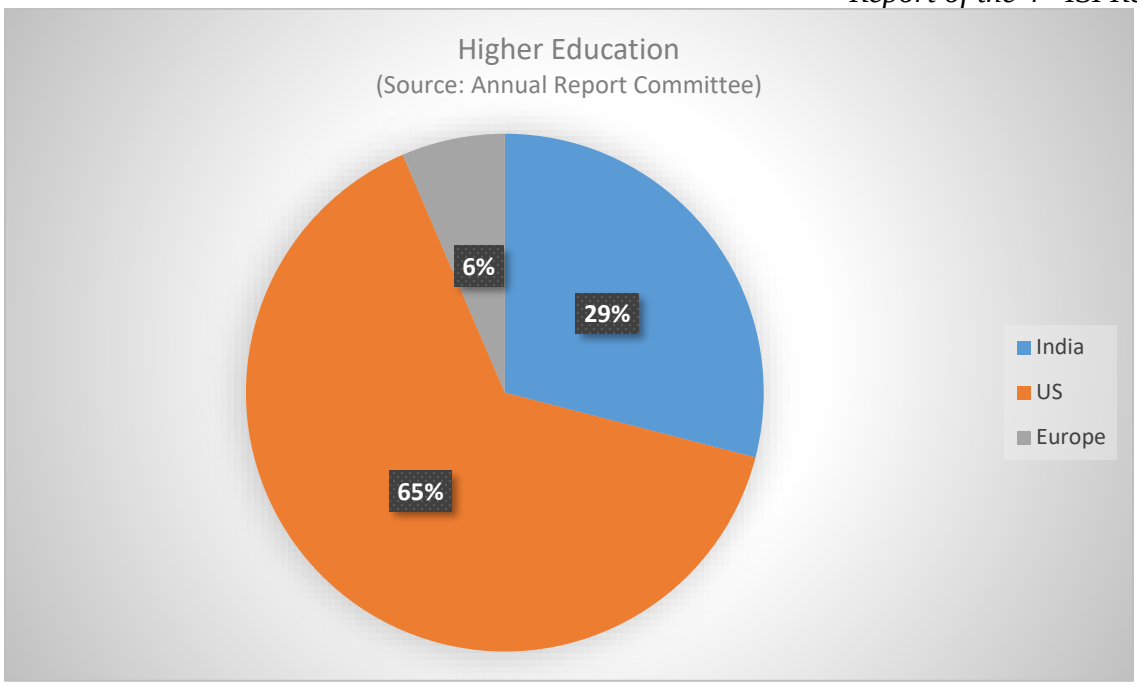

Fig. 8: Placement Record in Higher Education in ISI (2019)

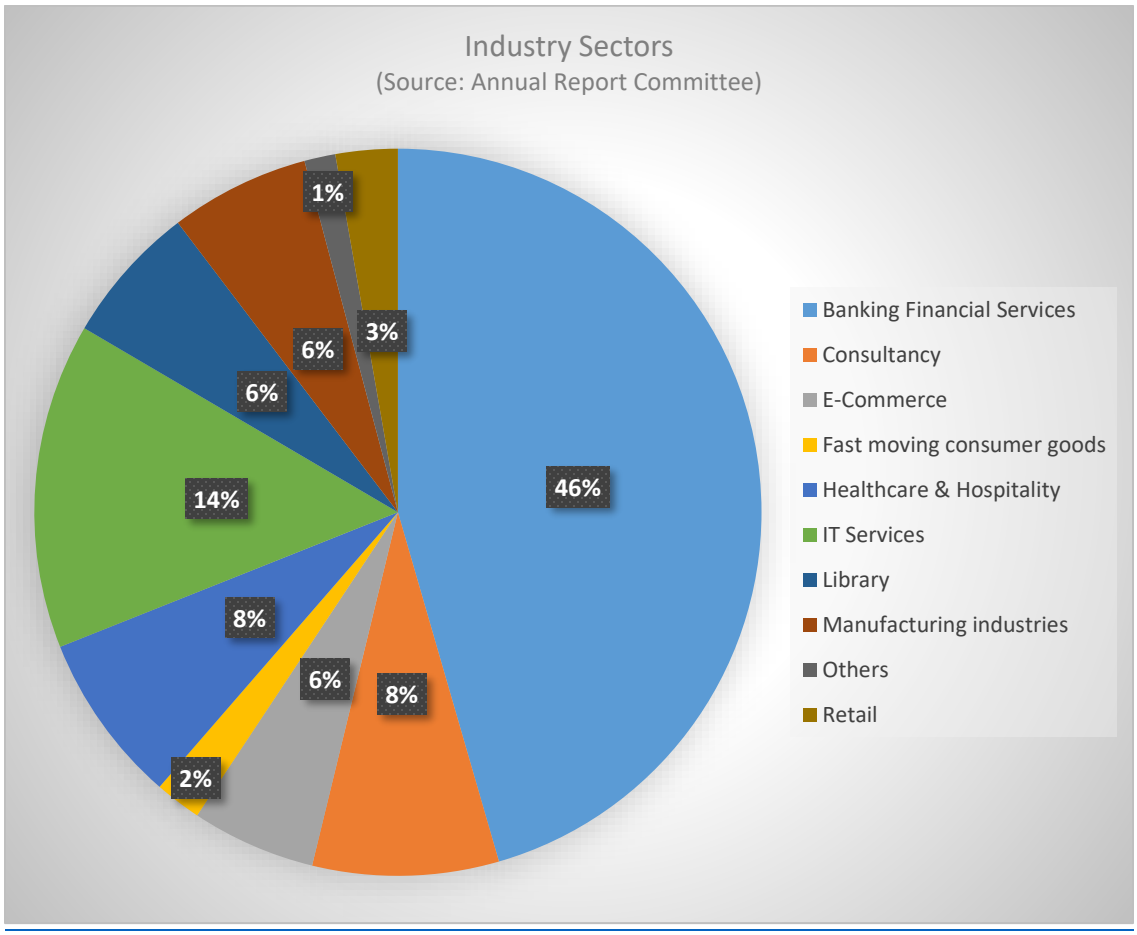

Fig. 9: Placement Record in Industry Sectors in ISI (2019)

Table 3: ISI Alumni in Statistics Departments in Other Institutions

University	**Number of ISI Alumni in Statistics Department or Statistics Groups Elsewhere**
Penn State Univ, Statistics	2
Univ of California, Berkeley, Statistics	2
Univ of Michigan, Biostatistics	3
Univ of Michigan, Statistics	2
Stanford Univ, Statistics	1
Purdue Univ, Statistics	1
Univ of Minnesota, Biostatistics	1
University of Minnesota, Statistics	1
University of North Carolina, Statistics & OR	1
Harvard University, Statistics	2
IIT Kanpur Dept of Math & Stat	4
IIT Bombay Dept of Math	4
Calcutta University	1
Indian Institute of Science (Stat)	3

Chapter 5

As per the Terms of Reference (ToRs)

5.1 ToR (a)

Review of the present status of Indian Statistical Institute (ISI) in fulfillment of its objectives as an institute of national importance

- The basic objectives and foundational principles as laid down in the objects of ISI are broad, far-sighted and remain relevant to this day. RC feels that the Institute has to redefine its role, not its objectives, in the changing context of technological advancement and data explosion in a variety of fields. Focus on Statistics in the broad sense remains. The research in natural and social sciences envisaged in the second objective captures almost all areas where huge data is generated these days.
- The institute needs to expand its horizon, and align its teaching and research programs to the national needs. In this context, Mahalanobis's study of flood management may be taken as an example. The main mission of ISI should remain to use Statistics and related fields to serve the society. A three- pronged strategy could be
    - to work on statistical and computational methods and innovations therein,
    - to provide service to various sectors of the Indian society, and
    - to train more people in data science, that encompasses training of Statistics, mathematics, computer science, economics and related areas.
- Given the requirements of skilled data scientists in the country, ISI needs to scale up the number of students it graduates. Without this, other institutes will step up their efforts, and ISI will be left back, gradually diminishing in importance and relevance. Very importantly in this context, a narrow and traditional definition of Statistics may be damaging. Efforts should be made to add more students in the fields of Data Science, Mathematics, AI & Machine Learning.
- ISI should also reach out, in a big way, to train the teachers of the Statistics Departments of most other Universities that are struggling. It is regrettable that even after ninety years of establishment of the institute, the requirement of high-quality teaching in Statistics in the country remains unchanged. ISI should focus on development of statistical methodology and computing technology.
- In its bid to reach out to more, ISI should make use of technology in a big way. Digital learning offers the opportunity to grow exponentially with quality and ISI needs to prepare its digital infrastructure for the same. ISI has a chance to redefine scale without traditional geographic extension.
- ISI should devise ways of reviewing its activities at regular intervals with external inputs, especially from the industry. In particular, there is the need to get a feel about the expectations of the external world, from the perspective of users of technology, from ISI, and how far ISI has fulfilled such expectations.

5.2 ToR (b)

Review the performance of various units/departments/divisions of the institute during the last 10 years.

The Institute is broadly divided into seven scientific divisions:

Seven Scientific Divisions
Applied Statistics
Biological Sciences
Computer and Communication Sciences
Physics and Earth Sciences
Social Sciences
Statistical Quality Control and Operations Research
Theoretical Statistics and Mathematics

Each division was asked to submit a detailed report of their activities in the past ten years. Each division submitted a detailed report as well as an executive summary.

The main parameters on which the divisions were reviewed are:

- Teaching and training performance
- Research relevance and excellence
- Collaborative activities
- Generation of resources

The findings are summarized below, while the Executive Summaries provided by each Division is annexed to this document.

5.2.1 Applied Statistics Division

The Applied Statistics Division (ASD) comprises 28 faculty members as of November 2020. This number has remained more or less unchanged over the last ten years. This division is spread over four locations:

- Kolkata – 24 faculty members in 2 Units
- Chennai – 2 faculty members
- Bengaluru – 1 faculty member
- Tezpur – 1 faculty member

In one Kolkata unit of this division, there are five cryptologists, of whom three have an engineering background and two have Statistics background.

The division faculty members teach most of the Statistics and related papers as also Computer Science and Cryptology papers in the regular academic programs of the Institute. The regular teaching load is about 0.7-0.8 per faculty per semester, averaged over the last five years. The RC felt that compared to some other similarly placed Institutes the teaching load is low. In addition, the class sizes in ISI, especially for optional and research courses, are also relatively small. The RC noted that in addition to teaching, the divisional faculty also engages

in a large number of training workshops and similar programs over the year.

The main research areas of the divisional faculty are in areas of statistical methodology development and applications, and cryptology. The faculty has produced, on an average, about 2 research papers per faculty per year, averaged over the last five years. The RC noted that the division has produced only about 1.3 PhDs per faculty in the last five years. A deeper look revealed that a significant proportion of these PhDs are in Computer Science (Cryptology), supervised by the five Cryptologists of the division. The Statistics faculty members have not produced enough PhDs, despite the fact that most of them are in senior positions. Another point of concern noted by the RC is that even these PhD theses are supervised by only a handful of faculty members. There are several faculty members who have not produced a single PhD in the last ten years. A point to note is that this is not a unique drawback of this division, but appears to be the case in most other divisions as well.

The division has attracted external grants to the tune of Rs. 53.36 lakhs per year. The RC felt that this amount, for a division with 28 faculty members, is very low. Once again, a deeper look revealed that much of this grant has been obtained by a handful of faculty members, with the others not making much effort in this direction.

The RC noted that some faculty members of the division provide important service to various government entities, and in the process, have developed interesting indices and/or insights into a number of government processes. Some of the faculty members have also be recognized with awards and honors. Some of them serve is apex level government committees.

5.2.2 Biological Sciences Division

The Biological Sciences Division (BSD) comprises 14 faculty members as of November 2020. This has been diminishing over the years, with the number reducing from 21 to 14 between 2010 and 2020. This division is spread over two locations (Kolkata and Giridih) as follows:

- Kolkata: 3 Units with 12 faculty members
- Giridih Unit of Agriculture and Ecology Research has 02 faculty members

The division has three Statisticians among the 12 faculty members in Kolkata.

The Statisticians of the division teach Statistics and related papers in the regular academic programs of the Institute. The faculty members also teach some optional papers, closer to their areas of research, to the regular students of the Institute. On an average, the regular teaching load comes to about 0.8 per faculty per semester, averaged over the last five years. However, a deeper look yields that most of the teaching is done by only a handful of the faculty members of the division. However, it was informed to the RC that with the introduction of a new one-year Diploma program in ISI Giridih, more faculty members of the division are getting involved in teaching. A small number of faculty members of the division are also engaged in teaching outside ISI in other Universities. The divisional faculties also participate in workshops and short-term training programs.

The RC noted that the faculty of the division has produced, on an average, about 3 research papers per faculty per year. Some of the papers are in good to very good journals. However, the RC felt that the general level of publications of the division can be termed average with not much visible and outstanding research having been reported from division in the last 5-10 years. The visibility of the division is also rather low among the peers.

The division has produced about 3 PhDs per faculty in the last five years. The RC again noted that the PhD students of this division, even those who are admitted through the regular admission process and who get their fellowships from ISI, have to register in external Universities as ISI does not give degrees in these areas.

The division has attracted external grants to the tune of Rs. 485 lakhs in the last five years, making it Rs 97 lakhs per year. The faculty members of the division also train a large number of Masters students. Some of the faculty members of the division have been recognized with awards and fellowships of a few national academies.

5.2.3 Computer and Communication Sciences Division

The Computer and Communication Sciences Division (CCSD) comprises 50 faculty members as of November 2020. This division has eight units of which five are in Kolkata, two in Bengaluru, and one in Chennai. The broad areas of research comprise Machine Learning and Artificial Intelligence, Distributed Computing, VLSI Design, Cryptography and Theoretical Computer Science.

The division faculty members teach in the M. Tech. in Computer Science, M. Tech. in Cryptology and Security and most other courses in the Institute, including some papers in B. Stat., M. Stat., PGDBA etc. Between 2015 and 2020, the average teaching load of the faculty of this division has hovered around 0.48 per faculty per semester. Compared to some other similarly placed Institutes, the teaching load is low. In addition to teaching at ISI, the divisional faculty also engages in teaching programs in other institutions and a large number of training workshops and similar programs.

The divisional faculty publishes on an average five research articles each year per faculty as observed over the last five years. They also have a few patents awarded and technologies transferred. Thus overall, the research and development performance of the division is quite good.

Again, the RC observed that the division has produced only about 1.6 PhDs per faculty in the last five years. Some PhD students from this division are also known to register in external bodies like Calcutta University, Jadavpur University, etc. Hence the total number of PhDs supervised may be a little higher, but still, it is less than desirable. The RC again observed that several faculty members have not produced any PhDs in the last ten years. The RC is seriously concerned on this count, and recommends a PhD supervision norm to be evolved. The faculty members of the division have also mentored a few post-doctoral students.

The RC noted that the divisional faculty have delivered invited and keynote talks in very large numbers. Several faculty members of the division are highly reputed and have international visibility. A large number of awards and honors have come to the division, including SS Bhatnagar awards, Infosys Award, JC Bose Fellowship, TWAS Prize. There are fellows of the science and engineering academies like INSA, INAE, NASI, TWAS and IEEE.

The RC observed that while several faculty members of the division bring in external grants, the number of such external grants and the quantum of funds attracted are much lower than that in comparable departments in similar institutes. For example, in 2019-2020, only 10 out of 50 faculty members have an ongoing external project. This is just 20% of the faculty. Hence the RC felt this effort should be increased substantially.

5.2.4 Physics and Earth Sciences Division

The Physics and Earth Sciences Division (PESD) comprises 20 faculty members as of November 2020. This division has three units: The Physics and Applied Mathematics Unit with 10 faculty, Geological Studies Unit with 8 faculty and Theoretical and Applied Sciences Unit with 2 faculty members. The first two units are in Kolkata and the third one is recently created in Tezpur.

The publication rate of the faculty has hovered around 3 per faculty per year. The number of PhDs produced by the faculty of the division is low. The teaching load of the division is also very low. The RC observed that while the Institute is admitting research fellows in Physics and Geology, these fellows are not permitted to get their degrees from ISI because of a restriction in the ISI Act 1959, amended in 1995. These students need to register themselves in other Universities, which is gradually becoming difficult with constraints imposed by the regulatory bodies in those Universities. The matter of amendment of the ISI Act is dealt with elsewhere.

On each aspect, viz., recognitions, awards and honors received, conferences/workshop organized, invited talks delivered, teaching activities etc., the division has an average performance. Research areas of the divisional faculty are too diverse, with critical mass not getting built in any direction at all. Cross talk and interaction with the scientists of other divisions is low. Only a few faculty members are holding external grants.

The RC felt that there is lack of enthusiasm and motivation among the divisional faculty, each content to do whatever he or she has been doing. One reason that emerged during the interaction is that although the faculty members of the division are keen to start academic and research programs, they are unable to do so because of the constraint in the ISI Act. Their PhD students, even those admitted through ISI admission tests, have to register elsewhere. There are hurdles in starting new teaching programs. The RC feels that this needs to be rectified at the earliest possible. Also, the division should be supported with more grants and space. At the same time, the faculty members have to ensure that they increase their visibility by organizing training programs, conferences and workshops. Being in ISI, they have the opportunity to initiate unique teaching, training and research programs, that is not possible in other Universities. This should be explored at the earliest. The division should become centres of activities in Geostatistics, Geoanalytics, Quantum Computing and Information Processing, Astrostatistics and such quantitative aspects of their disciplines. Future recruitments should be accordingly planned.

5.2.5 Social Sciences Division

The Social Sciences Division (SSD) comprises 36 faculty members as of November 2020. The faculty strength has decreased from 44 in 2015-16. However, very recently, there have been a few new recruits. There are 9 research units in this division. These units are geographically spread over Kolkata, Delhi, Bengaluru and one is recently introduced in ISI North East Centre at Tezpur. Historically, since the involvement of Mahalanobis in the 2nd five-year plan, ISI is a major research hub for econometrics in India and also recognized internationally. The Economic Research Unit in Kolkata and the Economics and Planning Unit in Delhi are responsible for supporting the academic and research programs of the division. In particular, the unique academic program Master of Science in Quantitative Economics first introduced in India by ISI, are run both from Kolkata and in Delhi primarily by ERU and EPU. These students get attractive placements especially in BFSI sector. The intake and training of these students, with backgrounds ranging from engineering, economics to Statistics, demonstrate the multi-disciplinary ethos of ISI.

One of the recommendations of the 3rd RC was formation of a sizable Economics research group at Bengaluru. Following this Economic Analysis Unit was formed at Bengaluru Centre. However, this group never really grew in size because of other constraints. Besides economics and planning, some of the important research initiatives of Mahalanobis in the field of social sciences eventually transformed into research groups and took shape as Sociological Research Unit at Kolkata and in Giridih, Linguistic Research Unit, Population Studies Unit and Psychology Research Unit, all of them in Kolkata. In 2012, an important need of the government was addressed through formation of Sampling and Official Statistics Unit at Kolkata under SSD. Since then, this unit is one of its kind in India with significant interface with the government, Ministry of Statistics in particular,

and offering services to various important public and private sector organizations. The very recent addition in 2019 is Socio-Economic Research Unit at Tezpur.

Structurally the division appears to be fragmented with some units having one or two faculty members as of now. The committee understands that the reason being restriction in faculty strength and the lack of applicants for faculty position having appropriate quantitative expertise in the relevant fields of social sciences, except for the field of economics.

The number of journal publications per faculty per year is approximately 1.6 averaged over last five years while the teaching load per faculty varies between 0.13 to 1.1 per semester, depending on the research focus of the unit. It is to be noted that some of the faculty members of this division do not have the relevant courses to teach in ISI academic programs. In addition to teaching, the divisional faculty members also engage in a large number of training workshops and similar programs. Both the Economics and Planning Unit (EPU) at Delhi and the Sampling and Official Statistics Unit at Kolkata are successful in attracting large external funds while the other units in the division are yet to gear up to that extent. The large external overseas fund at EPU has resulted in formation of a Centre of Excellence in Research in Climate, Food, Energy and Environment within ISI. While different awards and honors came to SSD, which include Infosys prize and Mahalanobis Medal, they are primarily connected to economics research of the division. Unfortunately, the number of PhDs produced by the division is far below the desired level, varying between 3 and 9 in last five years. Similar to some of the other divisions, the RC noticed that only a handful of faculty members in this division are supervising PhD theses and are involved in externally funded projects or consultancy.

Some of the faculty members have significant interface with the government in different capacities, both state and central government, organizations like RBI, Coal India, Ministry of Coal, DGCI&S to name a few. Sampling and Official Statistics Unit has noticeable inter-division collaboration especially with applied Statistics and computer science division.

5.2.6 Statistical Quality Control and Operations Research Division

The SQC & OR Division currently has 36 faculties in 8 units as of November 2020. The division has pan-India presence across 7 cities (Bengaluru, Chennai, Delhi, Hyderabad, Kolkata, Mumbai, & Pune) of India. While there are 15 faculty members in Kolkata, there are 1 faculty in Pune, 2 each in Mumbai and Delhi, 4 each in Hyderabad and Chennai, and 8 in Bengaluru. The RC noticed the legacy issue involved in SQC & OR Division, one of the most important wings of the institute. The profiles of faculty members include some with PhD degree and academic designation, some with PhD but non-academic designation while still there are quite a few faculty who do not have a PhD. A PhD program was started in this division in 2009, but even after a decade of existence, it is clear that the division had failed to take advantage of their own PhD program, both in terms of number of PhD graduated from this division and the number of research scholars currently studying in the division. The number of PhD student in this division is currently 5 while an abysmally low number have graduated so far from ISI.

The 3rd review committee stressed the need for consultancy activities by this division. Following the recommendation, the division is involved in consultancy activities to a large extent. The end-users of their expertise ranges from reputed government organizations and companies like Tata Steel, ITC, SBI, QCI, Ordinance Factory Board, to name a few.

The division had executed 73 to 95 number of consultancy projects each year for last five years, with 87

projects executed in 2019-20. The total project value was as high as approximately Rs. 4.8 Crores in 2017-18 while it is close to about Rs. 1.6 Crores in 2019-20.

The Division runs its flagship academic program M. Tech. in Quality, Reliability & Operations Research (QR & OR) since 1989. The RC appreciated its uniqueness of training statisticians in engineering and engineers in Statistics and eventually transforming them to quality professional. The committee thought that there is an urgent need to scale a program like this to serve the Industry 4.0. At the same time, the RC is of the opinion to thoroughly revise the M.S. program in QMS keeping in mind the current focus of MSME sector and the status of quality management at the international level. The committee understands that part-time courses on SQC & OR are also popular in Bengaluru and Chennai.

The RC notes that given the potential of business analytics and the need for quality consciousness in today's competitive world, the division had failed to deliver to the desired level. Only a small number of products and consulting solutions offered by the division can cater to the needs of industry. The division also needs to increase its training and consulting activities in other areas of Quality Management in addition to statistical methods for greater industry acceptance.

The research component of the division, which roughly summarizes to one journal publication per faculty per year, and the quality of journals where the papers are published in some cases, leaves much to be desired. At the same time, the industrial consultancy is also on the decline. The committee noted that per faculty external funding and consultancy project is minimum in Kolkata and that too, only restricted to a few from the group of scientists present in Kolkata. The situation is similar in Chennai and Hyderabad. Per faculty training programs are much better both in Mumbai and Pune. In fact, except for the Pune office, none of the SQC offices are profitable. At the same time, the RC also noted that there is little autonomy with the Office Heads, and a long bureaucratic procedure is followed for approvals.

The faculty members of the division have a good mix of backgrounds, in Statistics and engineering. However, there is very little inter-division collaboration, especially with Applied Statistics and Computer Science, so that wider range of value-added and high-value problems and projects may be targeted by this division. The division has almost non-existent international connect and lacks its presence in reputed national and international venues connected to quality movement. The committee thinks this is not only important but a must in today's connected competitive world.

5.2.7 Theoretical Statistics and Mathematics Division

The Theoretical Statistics and Mathematics Division (TSMD) is the largest scientific division of the Institute. The primary focus of this division used to be Statistics, Mathematics and Probability. Presently, the number of Statistics faculty seems to have reduced to just a handful in this division, while the number of faculty in Mathematics and Probability has increased substantially. As of November 2020, the total faculty strength was 59, located in the three Units in Kolkata (27 faculty), Delhi (12 faculty) and Bengaluru (20).

The division faculty members teach courses in the B.Stat., M.Stat., B.Math., and M.Math., MS(QE), and PGDBA programs, in addition to some research courses. The overall, divisional average teaching load is about 0.63 courses per semester per faculty, averaged over the last five years. This seems to be on the lower side. The typical class sizes have not been mentioned, but it is expected to vary between just a few students (for research courses) to around 50 in regular core courses.

In addition to teaching, the divisional faculty also engages in a large number of training workshops and similar programs. From the data provided, it is apparent that the Unit in Bengaluru is the most active. What was heartening to note was the large number invited/keynote talks and academic visits that the faculty of the division undertake, underscoring the visibility and high regard that the scientists enjoy around the world. On this count, the Unit in Kolkata seems to be the most active. However, the one in Delhi has an impressive record, despite the small number of faculty members there.

The faculty of the division has produced, on an average, about 1.48 research papers per faculty per year, averaged over the last five years. On observing the number of journal publications over the last 10 years, it can be observed that while the number peaked in 2014, it has been going down thereafter. In 2020, the average number of publications per faculty seems to be just over 1. Given the strength of the division, this seems to be on the lower side.

A strong disappointing observation is the number of PhDs produced by the division. The total number of PhDs graduated in the last five years is 31, with the number being as low as 3 in some year; this with a faculty strength of about 59. This makes it about 0.5 PhDs per faculty in five years. This is a rather low value. It seems possible that a large percentage of faculties may not have supervised a single PhD in the last ten years. On the other hand, the faculty members of the division have mentored a large number of post-docs.

In terms of getting external grants, the Unit in Delhi seems to be doing better than the other two Units despite its substantially smaller strength. The Unit in Kolkata seems to be lagging behind in this respect. Very few faculty members are holding external project grants.

Many faculty members of the Division are highly reputed and have international visibility. They have an enviable track record of receiving the top awards and Fellowships of the country including several SS Bhatnagar awards, Infosys Award, JC Bose Fellowship, ICTP Prize, CR Rao National Award for Statistics, BM Birla Science Prize, Swarnajayanti Fellowship. There are several fellows of the science academies of India like INSA, IASc and NASI, and abroad like TWAS and Institute of Mathematics Statistics. The division has several faculty members who were invited to speak at the International Congress of Mathematicians, a rare honor.

5.3 ToR (c)

Review the non-research academic programs of the institute, including admissions, course contents, evaluation, fees, incentivisation policy, etc.

5.3.1 Academic Programs

(i) The institute offers

- two bachelor degree programs,
- three Master of Technology programs,
- five Master of Science level programs and
- three post-graduate diploma programs.
- In addition, the institute offers research fellowships in nine different disciplines out of which PhD degrees are awarded by the institute in four disciplines namely Statistics including SQC OR, Mathematics, Computer Science and Quantitative Economics.

(ii) ISI had the foresight to pioneer several unique courses such as B Stat, B Math, MS (Quantitative

Economics) and many others. In some cases, ISI had introduced a course, such as B Stat, and established its identity internationally, even when there was conventional bachelor degree program in Statistics in Indian University system. The fact that quantitative economics or quality, reliability and operations research could be the thematic areas for master level degree program were recognized by ISI well ahead of time. ISI also recognized the need for institution-level cooperation leveraging domain expertise available in different institutes of national importance. As a consequence, a tri-institute post-graduate diploma in business analytics were first introduced by ISI, IIT Kharagpur and IIM Calcutta. Since then, such a model is adapted by many leading academic institutes in India.

(iii) From the early years, quality and personal attention was given priority over quantity in the academic programs of ISI. As a result, the student strength is still restricted so that intensive tutorial-type interactions are feasible in the ISI academic programs. The research focus, quality publications and world-class exposures of ISI faculty members help in designing unique course contents that demonstrate a balance between a wide horizontal learning and deep vertical probing. The M Tech program in SQC OR has an exclusive model of accepting both statisticians and engineers where in the first year, statisticians are trained in basic engineering while engineers are exposed to basic Statistics followed by tailored courses focusing on SQC and OR in the second year.

(iv) Besides the above-mentioned formal academic programs, ISI is known for conducting a number of short-term intensive courses in the form of school, tutorial, workshop or training program. The clientele ranges from students and teachers of academia, industry professionals and officers from the government. The topics of these courses are sometimes tailor-made for a specific government or industry need or addressing an exclusive research challenge.

5.3.2 Admissions

ISI conducts unique national level entrance examination for admission and except for the M Tech (Computer Science) where there is a parallel channel for admission through GATE, ISI, in general known for its elaborate and intensive admission process. ISI is probably one of those very few institutes in India who still rely on descriptive quantitative problem-solving based admission test followed by personal interview. The interview is technical in nature and in most cases test for conceptual quantitative skill of the applicant. ISI recognizes national level scholarship programs like Math Olympiad or KVPY and qualified students of these programs are allowed to appear in ISI interview without appearing in the ISI written admission test.

5.3.3 Course Contents

As mentioned earlier, course contents of ISI programs are reviewed at regular intervals, both by internal review committee and external experts. ISI Academic Council chaired by the Director of the institute oversees all matters related to the academic programs of the institute. All professors are members of the academic council while Dean of Studies act as the convener of the academic council. Adequate flexibility is in-built in the system to accommodate independence of the teacher and to recognize the need for quick introduction of certain timely topics. Evaluation of the students are performed at multiple levels, often involving examinations, assignments, presentations and mini-projects. Smaller class size and multiple teachers covering a subject help in organizing such a multi-modal evaluation process.

5.3.4 Fees and Incentivization

Traditionally ISI believes in promoting study and research in the field of Statistics, Mathematics and related application-driven quantitative sciences. As a result, over the years, ISI is providing stipends and contingency grants to students for most of its academic programs. In line with this policy, ISI does not charge any fees from the students. However, programs like post-graduate diploma in business analytics and similar programs, which are typically for working professionals, ISI is charging tuition fees at par with similarly placed institutions. The concept of not charging fees in general needs a fresh look.

Each academic program has the provision for award to be given to meritorious students as recognized by the Teachers Committee. The award is typically in the form of book grant and various prizes and medals at the end of the academic program.

5.3.5 Admission Test

ISI follows a stringent three-tier admission test policy. The admission test practice followed at ISI is one of the rarest in India that stresses on mathematical aptitude of the candidate. This is irrespective of disciplines the candidate is applying for admission to ISI.

- There is no other institute in the country that encourages multi-disciplinary admission, the way ISI encourages. It is not rare in ISI that a chemical or an agricultural engineer is studying for M Tech in Computer Science or Quality, Reliability and Operations Research. It is also not rare that a graduate engineer or a statistician is competing for M S in Quantitative Economics.
- In the first tier of the admission process, the applicant normally takes a test of mathematics of duration 2 hours. For undergraduate courses, the mathematics test is at the school leaving level. For Post-Graduate programs, the mathematics test is at the Bachelor's degree level.
- In the second tier, the applicant takes a subject test of duration 2 hours. For example, an applicant for M Tech in Computer Science may sit for subject test in any one of the disciplines of Computer Science, Statistics, Mathematics, Physics and Engineering. ISI also recognizes national level tests like GATE, UGC-NET, CSIR, in the admission process. But in all such cases candidate must pass through the third tier of the admission vertical. Based on a cut-off on the cumulative score of the first and second tiers, short-listed candidates are called for interview in the third tier.
- In the third tier, the candidate appears in a rigorous technical interview before the relevant selection committee. The final selection is done based on aggregate of marks obtained in all three tiers.
- Albeit limited, ISI had on earlier occasion arranged admission tests in centres like Dubai or Dhaka to attract expatriate Indian nationals.

The idea of foreign student participating in ISI courses is limited but not rare. For short-term courses on Statistics and related subjects, ISI has one of the most successful and longest programs conducted in the International Statistical Education Centre (ISEC), an Associate Institute of ISI, in cooperation with the Ministry of External Affairs, Government of India.

5.4 ToR (d)

Review the spectrum of research activities/achievements of the institute, including collaboration with academic institutes within and outside the country.

5.4.1 Research Activities

The founder of ISI introduced the idea of Statistics in India. His design of ISI was to grow and enrich the field of Statistics drawing challenges from different physical and applied disciplines. As a result, the *DNA* of ISI is multidisciplinary in nature. The institute was built from research projects. Research challenges drawn from biological anthropology or agriculture or analysis and interpretation of data from large scale sample survey helped the institute to grow, which in turn, helped the nation, helped to acquire the skill and knowledge required for national development. The research programs in ISI as of today is organized through seven scientific divisions.

i. Theoretical Statistics and Mathematics Division
ii. Applied Statistics Division
iii. Computer and Communication Sciences Division
iv. Social Sciences Division
v. Biological Sciences Division
vi. Statistical Quality Control and Operations Research Division
vii. Physics and Earth Sciences Division

ISI has always taken the leadership for developing statistical methodology, meeting international standard. Research in fundamental areas in mathematics and probability continue to bloom. In addition to Statistics, ISI is now considered to be one of the foremost institutions for mathematical research in the country and this status should be enhanced in the coming years. At the same time, Statistics as a subject has undergone extensive development in various application areas such as bio-medical research, machine learning, population studies, environment, bioinformatics and in industrial quality management. Problems of analyzing high dimensional, complex data are also rendering innovation in theoretical Statistics in its own way. As a natural consequence, a large number of young faculty members are venturing into interdisciplinary collaboration with other scientists. This indicates a paradigm shift in terms of the existing perspective of the division focused research. Statistics has distinctively evolved into statistical science with some overlap with mathematical sciences. In addition, applied Statistics has grown both in its scope and popularity over the years. The division will continue to be more actively involved in interdisciplinary research. Over the years, computer and communication Sciences Division has remarkable contributions in the field of theory and development of fuzzy mathematics, computational intelligence and pattern recognition. The social sciences division of ISI is known for its seminal contributions in the field of quantitative economics, economic planning and developmental economics. Interdisciplinary research initiatives are hallmarks of ISI research and some of the achievements are in bioinformatics, brain research and Bayesian neuro-imaging, social network analysis, statistical learning theory and image analysis, epidemiology, and human genetics.

5.4.2 Contribution

The RC acknowledged that ISI has made an enormous contribution to the country in its illustrious journey over the last 90 odd years. The glorious legacy continues and the ISI fraternity proudly upholds the tradition of uncompromising quality and value systems. It is not a coincidence that over 90% of ISI faculty has substantial academic exposure in the most developed countries and many have won prestigious awards like Padma

Vibhushan, Padma Shri, S. S. Bhatnagar Prize, Infosys Prize and so on. Multiple young scientists, young engineers and associates of learned societies every year is a telling evidence of the success of ISI in attracting and nurturing young talent. Further, ISI alumni are spread all over the world with a footprint in many of the top global universities, making contributions to theory development on a continuing basis. Apart from contributing to knowledge dissemination, skill development, capacity building and development of theory, ISI continues to work on innovative multidisciplinary application-driven research to solve problems of national importance. The recent contributions of ISI in the areas of developing coal index, currency management, understanding extinction risk of wildlife, accurate assessment of consumer confidence, development as well as assessment of encryption methodologies, assessment of risk from counterfeit currencies, improvement of defence production systems, understanding level of cleanliness of towns and cities calibrated by their inherent complexity are just a few examples. In the research front, a few notable and recent examples of high impact work are a complete solution to the celebrated Zariski Cancellation Problem that had remained unsolved for seventy years, and the discovery of about 240-million-year-old horned reptile *Shringasaurus indicus* (within top 10 important species discovered in 2017 according to PLoSOne Blog, Dec 2017, and as also reported in The Guardian, 28 Dec 2017). Several notable contributions have been made in the field of Pattern Recognition, Computational Intelligence, Bioinformatics to name a few. The formation of R C Bose Centre for Cryptology and Security, a dedicated centre of research in cryptology and security, is a definite recognition of ISI for its contribution in application-driven research.

5.5 ToR(e)

Review the extent and intensity of interaction/collaboration with government, industry and other organizations in the country, in contributing to country's economic and social development needs as also for meeting the supply demand gap for statistical and analytical personnel.

Almost all faculty members of ISI maintain national and/or international collaboration with peer groups from academia and/or industry in their respective field of research. Most of them are due to personal initiatives that are most productive in nature. Besides, the institute maintains a large number of formal MoU based collaborations, out of which many are international, so as to engage itself in greater degree of formal interaction with other institutions, universities and government organizations, to work on joint projects, and to hold regular workshops and conferences in the emerging areas of theoretical and application-driven quantitative sciences.

5.5.1 Extent and Intensity of Collaboration with the Government and Industry

Besides the generous support of the Government of India through its Ministry of Statistics and Programme Implementation in maintaining capital and revenue expenditure plan of the institute, ISI connects to various arms of the government as a part of its academic and research programs. The collaboration with government is organized at three different levels:

(a) In the form of government funded projects to solve specific operational problems. A dedicated group *Sampling and Official Statistics Unit* (SOSU) is mandated to address such problems. Very recently, they have participated in developing the National Coal Index which will help monetize the dynamics of coal auctioning and pricing system. SOSU is also engaged with National Sample Survey Organization (NSSO) at various levels to support them to modernize the survey process. Besides SOSU, other research units of ISI, like SQC OR unit, units from Social Sciences and Computer and Communication Sciences are involved in projects defined by the different departments of

government.

(b) ISI faculty members compete and secure research funds to solve various research problems defined by them under the different research funding programs of the government. The DST, DBT, MoD and government funded organizations like ISRO, DRDO, CSIR, NBHM etc. continue to support ISI faculty members depending on the projects submitted from ISI.

(c) Finally, ISI is involved in extensive training programs at different levels. Government officers take part in these programs. One of the notable long-standing programs are training of ISS officers. Recently ISI coordinated training of mid-level officers both at ISI Kolkata campus and abroad.

The connect with the industry is found to be weak. Although the Statistical Quality Control and Operations Research (SQC&OR) division engages more with the industry, a large number of such engagements are for training purposes. Only limited engagements deal with solving problems of the industry. The RC identifies this as one of the major weaknesses of the Institute, and urges that all scientific and academic workers should reach out to the industry to solve their problems. Often these problems contain interesting challenges that can open up avenues for theoretical research as well. In particular, ISI should capitalize on its deep expertise in Artificial Intelligence and Machine Learning, and related areas. It should reach out to the external stakeholders to play a greater role in national data strategy, national AI policy, etc. and also to enhance collaboration with internationally reputed industries in data science, analytics, healthcare, banking and fintech.

5.5.2 Contribution to Economic and Social Development

The most significant contribution of ISI is certainly the development of well-trained human resources in the field of Statistics, Mathematics, Computer Science and Quantitative Economics. ISI alumni are spread all over the world with a footprint in over 90% of the top global universities. ISI is probably the only one of its kind to train manpower in the field of SQC OR, who in turn, contribute to industry and thus has a definite impact in the economic development of the country. The execution of different research projects in collaboration with government agencies and/or leading industry help develop a community who are now ready to face the research challenge and increasing competitions from all across the globe.

5.5.3 Demand-supply Gap for Statistical and Analytical Personnel

There is a definite demand supply gap of well-trained statistical and analytical personnel. ISI is putting its limited efforts to mitigate the gap by introducing timely courses like post-graduate diploma in business analytics, training in Statistical Methods and Analytics, and in Analytical Methods in Agriculture and Rural Management. However, the focus of ISI since its inception is on quality rather than quantity. Therefore, while ISI appreciates the need for scaling up, it seems to be very cautious in adopting solutions to address the demand-supply gap of statisticians.

5.6 ToR(f)

Review the overall governance and administrative structure of the institute and inter-relationships between the different governing and administrative entities in the system.

The main structures relevant to the Indian Statistical Institute are the ISI Society with its General Body, the Governing Council, the Government of India and the Institute itself. The inter-relationships between these different entities are as shown in Fig. 10.

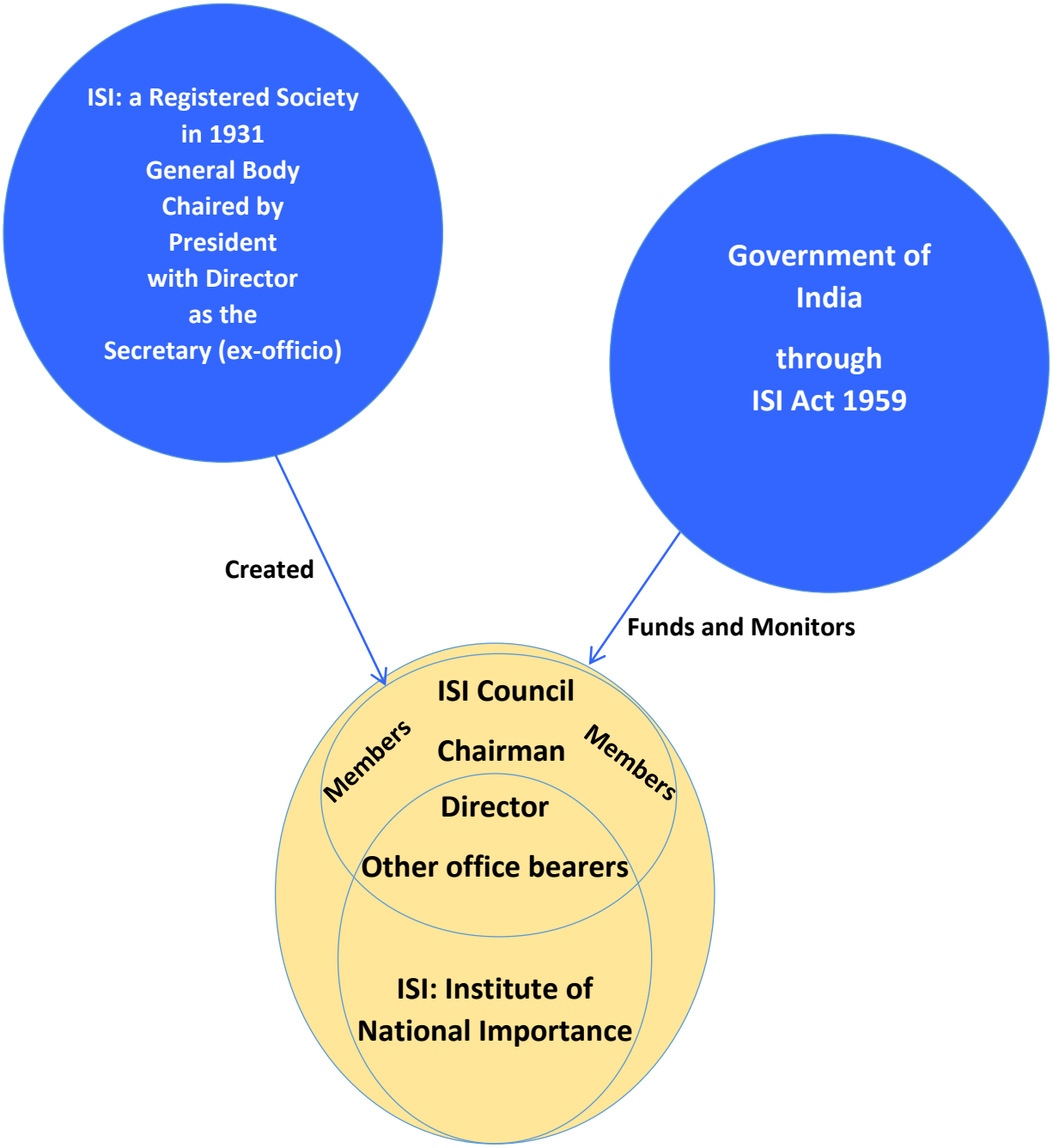

Fig. 10: Inter-relationship between Different Governing Entities in ISI

5.6.1 Basic Information about the Institute

- Founded on December 17, 1931.
- Registered as a society under the Societies Registration Act 1860 on 28/04/1932 with Registration No. 7347.
- General Body running the affairs of the Society, with a distinguished person, not employed in the Institute, elected as its President.
- Director, an employee of the Institute, is the ex-officio Secretary of the Society.
- The Memorandum of Association, Regulations and Bye-laws together constitute the overall constitution based on which all operations of the Society are to be executed.
- The Council is the governing body of the Institute, with an eminent person, not employed in the Institute as its Chair. Tenure of the Council is 2 years.
- Through the ISI Act 1959, the Institute became an Institute of National Importance
    - To be funded by the Government of India
    - Empowered to grant degrees
        - In Statistics till 1995
        - In Statistics, Mathematics, Computer Science and Quantitative Economics and areas related to Statistics since 1995
    - Structure of the Council:
        - Chairman, not an employee of the Institute, to be elected by the Council in its first meeting to be presided over by the President or his/her nominee
        - Government representatives: 06
        - Scientists not employed in the institute: 09
        - Elected representatives of the general body not employed in the Institute: 03
        - Elected representatives of the employees of the Institute: 02
        - Officers (all faculty members) of the Institute: 12
            - Director: 1
            - Prof-in-charge/Head of the seven academic divisions: 7
            - Heads of Delhi/Bengaluru/Chennai centres: 3
            - Dean of Studies: 1
        - Total = 33
        - Chief Executive (Administration and Finance) is the non-member Secretary of the Council.

The Structure within the Institute is depicted in Fig. 11.

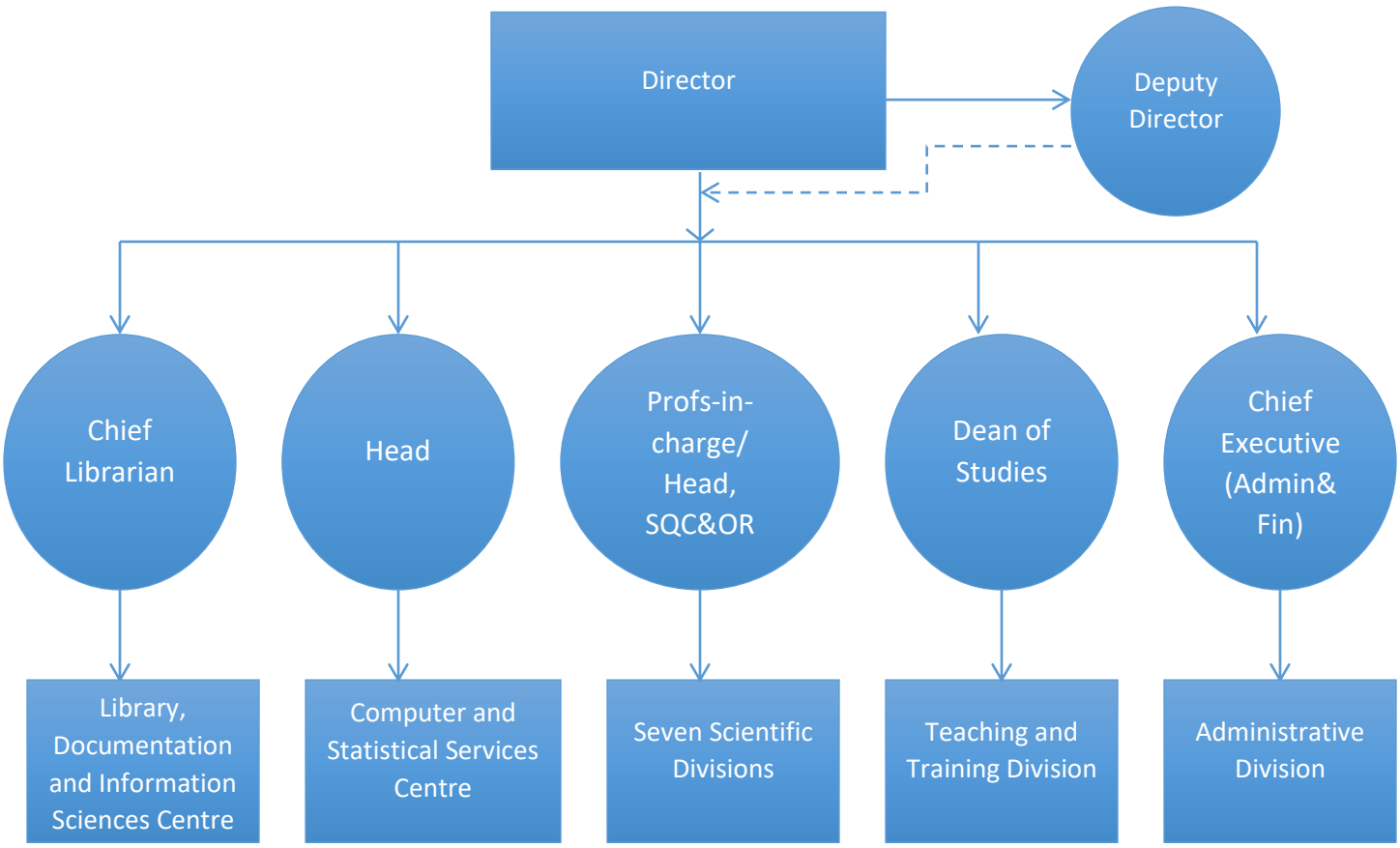

Fig. 11: General View of the Administrative Hierarchy in ISI

5.6.3 Bodies and Functions within the Institute

- Academic Council
  - Chair: Director; Convener: Dean
  - Members: Professors and equivalent and some other members
  - Objective: To recommend on matters of teaching/training/research programs
- Centers
  - Headed by Head of Centre
  - Reports to the Director
- Scientific Divisions: 07
  - Headed by Professor-in-Charge/Head, SQC&OR
    - Divisional Committee of Scientific Workers (DCSW): All scientific workers of the divisions
    - Elected by the DCSW members for a period of two years
  - Objective of DCSW: to recommend the research proposals and scientific budget of the division
  - Research proposals will be evaluated by Technical Advisory Committee (TAC) chaired by the Director, and consisting of external experts
- Teaching and Training
  - Headed by Dean of Studies

  - In charge of all regular academic programs of the Institute
  - Assisted by Associate Deans and Students-in-Charge
- The Library, Documentation and Information Sciences Division
  - Headed by the Chief Librarian

5.6.4 Some Other Structures in the Institute

- A branch in Giridih administered by an In-Charge
- Outlying SQC&OR Units in Hyderabad, Mumbai and Pune (the Council has recently decided to discontinue the SQC&OR unit in Coimbatore)
- RC Bose Centre for Cryptology and Security
  - Recently established Centre of Excellence in research in Cryptology and Security
- CECFEE – Centre for Research on Economics of Climate, Food, Energy and Environment
  - with a Board of Management advising the Centre.
- CAIML – Centre for Artificial Intelligence and Machine Learning
  - Spanning across divisions and units
- The two Associate Institutes
- International Statistical Education Centre
  - Board of Director with an eminent external expert as the Chairman
  - Member-Secretary, usually a faculty member of the Institute.
- Centre for Soft Computing Research
  - An In-charge administers the Centre

5.7 ToR (g)

Assess the adequacy of the institute's financial resources, including grants from government, revenue generation activities, and available physical assets – like land, buildings, equipment, for institute's activities.

The funds flowing in into ISI are primarily under three channels:

a. Grants-in-aid provided by the Central Government
b. Internal Revenue
c. External grants

The Internal Revenue generation essentially means generation of own funds, which presently is through the following means:

a. Earning from consultancy and training programs
b. Overheads from externally funded projects
c. Tuition fee for one Tri–Institute program
d. Interest on Short term deposits
e. Sale of admission prospectus, etc.

The external grants received are from external agencies (like DST, DBT etc.) for research projects to be executed by the faculties of the Institute. These funds include funds for hiring of students, purchase of equipment, travel, consumables and contingency expenses. These projects also have a component of overhead that becomes internal revenue.

5.7.1 Grants-in-aid, Internal Revenue and External Grants

The large part of the Grants-in-aid received from the Central Government is for payments of Salary, while much less amounts are under General and Capital heads. For example, the Budgetary Estimate (BE) of 2021-2022 is Rs. 320.01 Crores, with a break up of Rs. 261.18 Crores under Salary, Rs. 32.00 Crores under Capital and Rs. 26.83 Crores under General. Fig. 12 gives the average percentage distribution over these three heads over the period 2015-2020.

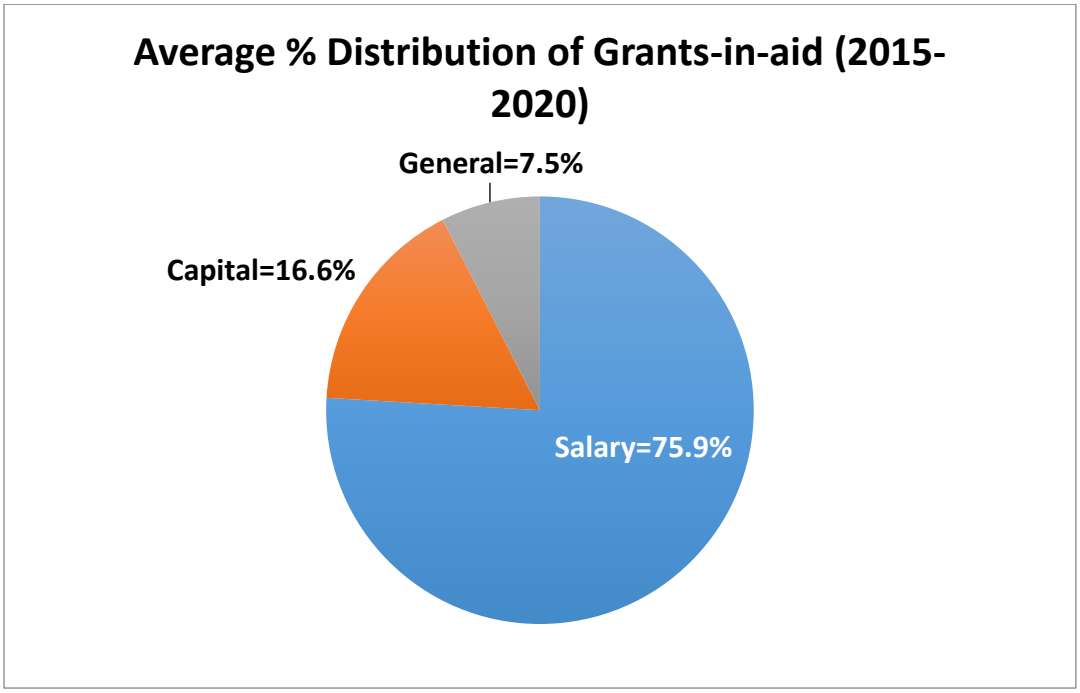

Fig. 12: Distribution of Grants-in-aid in ISI

The Institute has traditionally been almost fully funded by the Government of India. Table 4 shows the main items of income and expenditure of ISI. It can be seen from the table that over the years from 2010-2011 to 2019-2020, the Grants-in-aid has increased with a Compounded Annual Grown Rate (CAGR) of 7.26%, while over the same period the expenditure has gone up with a CAGR of 10.91%. It is also noted that during this period, the internal revenue has increased with a CAGR of 12.18% and the external funds received has increased with a CAGR of 11.27%.

Considering the total budget to be the sum of Grants-in-aid received, internal revenue generated and external funds received, the percentage of external funds received with respect to the total budget has increased from 5.4% in 2010-2011, to 6.2% in 2015-2016, to 7.27% in 2019-2020. Though there is a steady increase here, ideally the total external funds received should stand between 10% and 30% of the total budget. However, it is also to be noted that ISI is primarily an institution for theoretical, basic science research. Therefore, the possibility of earning significantly higher external revenues seems limited.

Table 4: Income and Expenditure

INCOME				
Head	**Rs. In Crores**			**Compounded growth rate from 2010-2011 to 2019-20 (%)**
	2010-11	**2015-16**	**2019-20**	
Total Grants-in-Aid	**148.02**	**206.35**	**278.03**	**7.26**
(i) Salary	104.2	154.37	217.07	8.50
(ii) General	19.77	11.6	29.44	4.52
(iii) Capital	24.05	40.38	31.52	3.05
Internal Revenue	**3.36**	**4.71**	**9.45**	**12.18**
Grand TOTAL	**151.38**	**211.06**	**287.48**	**7.39**
External Funds Received	**8.63**	**14.00**	**22.57**	**11.27**
EXPENDITURE				
SALARY	98.06	161.67	249.00	**10.91**
GENERAL	18.48	33.24	30.16	**5.59**
CAPITAL	12.27	27.18	22.26	**6.75**
TOTAL	**128.81**	**222.09**	**301.42**	**9.90**
Research Expenses	23.81	59.50	51.88	**9.04**

Table 5 shows the distribution of the Grants-in-aid received by ISI across the Headquarters, its Delhi and Bengaluru Centres, and all the other Centres/Units taken together. As expected, a substantial part is used for the Headquarters at Kolkata.

Table 5: Income and Expenditure

CENTRE-WISE AND HEAD-WISE AVERAGE ANNUAL GRANTS AND PERCENTAGE EXPENDITURE DURING 2017-18 to 2019-20					
					(Rs. In Lakhs)
Heads	**Kolkata**	**Delhi**	**Bengaluru**	**Others**	**Total**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Grants - in – Aid (Salary)					
	74.03	**8.54**	**11.16**	**6.26**	**100**
Expenditure (Salary)					
Salary	70.79	8.49	12.56	8.17	100
Terminal Benefit	81.21	8.15	7.86	2.78	100
Stipend	73.68	10.59	12.77	2.95	100
TOTAL	**73.96**	**8.53**	**11.23**	**6.29**	**100**
Grant - in – Aid (General)					
	76.49	**7.62**	**8.18**	**7.71**	**100**
Expenditure (General)					
Books and Journal	90.45	2.99	5.5	1.06	100
Electrical, Telephone Taxes	63.97	14.46	8.61	12.96	100
Repairing	81.99	4.85	5.79	7.37	100
Others	61.13	10.56	14.05	14.27	100
TOTAL	**75.65**	**7.81**	**8.45**	**8.1**	**100**
Grant - in – Aid (Capital)					
	52.79	**3.01**	**12.05**	**32.16**	**100**
Expenditure (Capital)					
Building	78.39	5.14	1.5	14.97	100
Furniture	43.45	20.22	7.04	29.26	100
Computer	76.84	5.49	8.13	9.54	100

5.7.2 Assets of the Institute

The assets, in terms of land, are depicted in Table 6.

Table 6: Land Assets

Sl no.	Location	Land (area as per deed)	Building (area as per deed)
1	Kolkata	35.03 Acres	56200.44 sq mtr
2	New Delhi	14 Acres	149277.90 sq ft
3	Bengaluru	30.00 Acres	19708 sq mtr
4	Tezpur	24.84 Acres	11988.225 sq mtr
5	Giridih	50.56 Acres	NA
6	Hyderabad	7.00 Acres	14107 sq ft
7	Chennai	8.00 Acres	1104.32 sq mtr
8	Vadodara	1 Acre 21 Guntha	Vacant land
9	Mumbai	Nil	4(Four) Flats; area 3085 sq ft
10	Pune	Nil	4(Four) Flats; area 2540 sq ft
11	Takdah, Darjeeling*	2.43 Acres	Building (area 7857 sq ft)
12	Baruipur	3.00 Acres	Advance of Rs. 19.93 Lakh paid, but possession yet to be granted
* The lease has expired; applied for renewal			

The total fixed asset cost is approximately 191.40 Crores.

5.7.3 Computational Resources

In terms of computational resources, there are centralized as well as distributed resources. While the individual units have their own computing infrastructure comprising PCs, workstations and GPU servers, the Institute also maintains some centralized facilities created either from within the Grants-in-aid or through external grants. Table 7 shows the main centralized computing resources.

Table 7: Centralized Computing Resources

Sl. No.	**Server Name**	**Server Chassis**	**Year of Installation**	**CPU**	**CPU Throughput**	**Memory**	**Cost** (Rs.)	**Users**
1	**Cisco Blade Server - UCSB-EX-M4-1**	Cisco UCS 5108 AC2	2014	4 x Intel Xeon E7-4890 v2	167.58 GHz	1.00 TB	65.92L	About 350 (including faculty, research scholars and students)
2	**Cisco Blade Server - UCSB-EX-M4-1**			4 x Intel Xeon E7-4890 v2	167.58 GHz	1.5 TB		
3	**Cisco Blade Server - UCSB-EX-M4-2**	Cisco UCS 5108 AC2	2016	4 x Intel Xeon E7-8890 v3	179.57 GHz	2.00 TB	132.15L	
4	**Cisco Blade Server - UCSB-EX-M4-2**			4 x Intel Xeon E7-8890 v3	179.57 GHz	2.00 TB		
3	**Cisco Blade Server - UCSB-5108-AC2**	Cisco UCS 5108 AC2	2018	4 x Intel Xeon Platinum 8164	208 GHz	1.00 TB	29.24L	

Recently, the Institute has been carrying out a six-institute cluster project on oral and cervical cancer. This is called the Systems Medicine BioCluster (SyMeC). A data centre has been created in ISI for the work ongoing under SyMeC. Table 8 depicts the configuration of the SyMeC data centre.

Table 8: SyMeC Data Centre

System Name	Make/Model	Year of Installation	Processor name and Speed	No. of Cores and RAM	Storage	Overall Speed and cost	#users
SyMeC Data Centre	HP DL380 Gen 10	2018	Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz	40/server x 19servers = 760 cores with RAM 192GB/server x 19servers = 3648GB	25TB usable	Speed=60TF; Cost=Rs. 223.40L	30
	4 GPUs	2018	Nvidia Tesla P100 @ 5.3TF	Each GPU with 3518 Cuda Cores with 16GBRAM			
	High Memory Server HP DL580 Gen 9	2018	Intel(R) Xeon(R) E7 8867 CPU @ 2.40GHz	64 with RAM 4TB	7TB usable		
	Storage Solution Cray ClusterStore L300	2019	Bandwidth : 27GBps		2PB(2048TB) usable	323.13L	
	Cisco Blade Server - UCSB-EX-M4-1						

5.8 ToR(h)

Examine the need for any changes to the Indian Statistical Institute Act, 1959 and its Memorandum of Association.

Background

- *1959:* The ISI Act was enacted in 1959
  - It declared the Institute to be an Institute of National Importance
  - Empowered to give degrees in Statistics and other subjects related to Statistics as may be determined from time to time.

  - The ISI to receive Grants-in-aid from the Government of India.
  - Accounts of the Institute to be audited by the auditors selected by the Central Government.
  - Government could appoint several committees to prepare the programs of work to be taken up in the Institute and the corresponding budget, and to review, inspect and evaluate the work done, assets, etc.
  - Power to the Central Government to issue instructions and take control of the institute in specific cases.
- 1995: The ISI Act was amended
  - Empowered the Institute to give degrees in Statistics, mathematics, quantitative economics, computer science and such other subjects related to Statistics as may be determined by the Institute from time to time.

- It is observed that ISI admits research scholars in disciplines of natural and social sciences where it is not empowered to give degrees.
- These scholars need to register in other Universities for their degrees
- The faculty of these divisions has multiple times expressed their discontent and disenchantment because of this restriction.
- The subcommittee of the RC looking into these divisions has recommended that teaching programs should also be initiated in these divisions.
- Accordingly, the Institute had, with the approval of the ISI Council (in its meeting dated 15th November 2017) and the General Body (7th September 2018), proposed to the nodal ministry for amendment of the ISI act to include subjects in natural and socials in the list of subjects to give degrees in.
- In response the nodal ministry had suggested the following language:
  - Notwithstanding anything contained in the University Grants Commission Act, 1956 or in any other law for the time being in force, the Institute may hold such examinations and grant such degrees and diplomas (a) in Statistics, mathematics, quantitative economics, computer science, (b) and such other subjects related to Statistics (c) as well as other subjects of natural sciences, social sciences and multi-disciplinary areas having a bearing on mutual development of Statistics and these areas as may be determined by the Institute from time to time.

- The Council, in its meeting dated June 14, 2019, approved the language proposed by the nodal ministry and the Institute had communicated this to the nodal ministry on June 24, 2019.
- The matter stands there. The nodal ministry needs to move the matter further.
- The RC notes that IITs give degrees in Technology, Sciences, Management, Humanities; IISc gives degrees in Science, Engineering, Management and Humanities; even Institutes of Information Technology are giving degrees in Human Sciences (which effectively encompasses Social Sciences).
- Taking all into consideration, the RC urges the nodal ministry to approve the amendment of the act, as per the language proposed by them and agreed to by the Institute, at the earliest.
- This will enable the scholars admitted with full fellowship by ISI to get their degrees from the Institute. It will also make the task of achieving the targets set by the National Education Policy a little easier to achieve.
- Moreover, this will remove a major point of discontent of all the faculty members of these divisions. It will also bring all faculty at a uniform level in terms of their duties.
- The Institute should take care that the faculty recruitments in these divisions, even if for limited numbers, maintain the level of excellence that ISI is known for. Subsequent to these enabling changes, the onus of becoming excellent, of attracting bright students and getting sufficient external grants to

develop their disciplines will lie with the faculty members of these divisions.

- Simultaneously the RC also strongly recommends that the Institute should take care that all programs initiated in the Institute should have a strong statistical, quantitative and/or computational component in tune with the times, making the programs unique in nature from other programs existing at most other academic organizations.
- The RC also noted that each year the statutory auditors appointed by the Central Government as well as CAG auditors audit the accounts of the Institute.
- If that is so, then the RC recommends that mandatory audit by CAG auditors may be included in Para 6 of the ISI Act. This would enable the Institute to get FCRA exemption that many other centrally funded institutes enjoy.

5.9 Tor (i)

In light of the review of the above aspects, recommend suitable measures, as also reorganization/restructuring, including the requirement of resources, to enable the institute to play a more effective role in serving the economic and social development needs of the country.

While making the recommendations, the RC kept in mind the following:

- The objectives of the Institute and the role it is supposed to play in the national scenario, as well as in the international arena.
- To position the institute so as to make it a primary hub of research and teaching in Statistics and other quantitative sciences with special emphasis on knowledge discovery from data.
- The need to enhance the research productivity as well as to encourage inter-disciplinary work.
- To align with the National Education Policy (NEP), that provides a policy roadmap for the entire higher educational system of the country. Some salient paragraphs of NEP 2020 are quoted below:

    - Para 10.1. The main thrust of this policy regarding higher education is to end the fragmentation of higher education by transforming higher education institutions into large multidisciplinary universities, colleges, and HEI clusters/Knowledge Hubs, each of which will aim to have 3,000 or more students.
    - Para 10.2. Moving to large multidisciplinary universities and HEI clusters is thus the highest recommendation of this policy regarding the structure of higher education. …
    - Para 10.7. By 2040, all higher education institutions (HEIs) shall aim to become multidisciplinary institutions and shall aim to have larger student enrolments preferably in the thousands, for optimal use of infrastructure and resources, and for the creation of vibrant multidisciplinary communities. Since this process will take time, all HEIs will firstly plan to become multidisciplinary by 2030, and then gradually increase student strength to the desired levels.
    - Para 10.11. Single-stream HEIs will be phased out over time, and all will move towards becoming vibrant multidisciplinary institutions or parts of vibrant multidisciplinary HEI clusters, in order to enable and encourage high-quality multidisciplinary and cross-disciplinary teaching and research across fields. Single-stream HEIs will, in particular, add departments across different fields that would strengthen the single stream that they currently serve.

The RC notes the emphasis on the need to become multi-disciplinarity that is ingrained in NEP 2020. In this context, the RC finds no conflict with the founding principles of the Indian Statistical Institute, which encompasses sufficient multidisciplinarity in its objectives. The B. Stat. program designed in 1960s embodied a vibrant level of multi-disciplinarity. The RC feels that the Institute may only require some course correction to be on the path to becoming a truly multi-disciplinary institution. The RC believes that the Institute already has multiple disciplines within it, some of which may need a little more enabling policies, to be called a multi-disciplinary Institute structured around its core areas of expertise in Statistics, Mathematics, Computer Science and Economics.

The RC acknowledges that it may not be possible for the Institute, may even not be desirable, to become multi-disciplinary in a very large way, with establishment of many departments where presently the Institute has no experience and expertise in. However, it should be possible for the Institute to tie up with other local Universities for this purpose, if required.

It is now important to analyze the future trajectory of the Indian Statistical Institute in this backdrop and in the light of other considerations. Two opinions that emerged during the discussions regarding the correct balance to strike between focus and diversity are as follows:

i. To strengthen the degree as well as the non-degree awarding disciplines in ISI with a view to become truly multi-disciplinary institution by 2030 as envisaged in NEP 2020.
ii. To focus only on the four degree awarding disciplines.

Adopting Option (i) would mean to enable the growth of the other disciplines of natural and social sciences already existing in the Institute. That would make ISI sufficiently multi-disciplinary to remain an independent, stand-alone institution in future. At the same time, care needs to be taken that this growth in natural and social sciences does not come at the expense of the areas where the real strength of the Institute lies, or should lie, viz., Statistics, Mathematics, Computer Science and Economics.

Adopting Option (ii) would mean to phase out the other non-degree awarding disciplines of natural and social sciences existing in the Institute over time. In this case, ISI may not have the position of a stand-alone institution, but would perforce become a part of a cluster of several (mono/a-few)-discipline institutions. This may lead to lower levels of autonomy for the Institute and more restrictions on its functioning which would necessarily have to be in conformation with other institutions in the cluster.

There were deep discussions within the RC on how ISI should be positioned in future. Some felt that ISI should dive deeper in its areas of strength and excellence, while some others felt that the basic objectives of the Institute encompassed research in natural and social sciences needs to be continued, in addition to enhancing the degree awarding disciplines. Moreover, the definition of Statistics has to be seen in a broader perspective in this era of data abundance. At the same time, all agreed that ISI cannot and should not dilute its focus on the core disciplines where it is known to be a leader. However, it was also agreed that it is not necessary that the Institute will be a leader in every single discipline it has. In disciplines where it is not the leader, it may play an active supporting role in research and teaching. Finally, there was a general consensus that any research in ISI must have a strong quantitative component or be targeted towards ultimately having a strong quantitative component.

Keeping the above in mind, the recommendations are being framed. These recommendations are provided in the following chapter titled *Recommendations of the 4th ISI Review Committee*. The thought process behind each recommendation is also being noted down, as far as possible, for future reference.

Chapter 6

Recommendations of the 4th ISI Review Committee

The Indian Statistical Institute is an Institute of National Importance, with all activities ultimately focused towards:

- Producing excellent research in its chosen scientific areas
- Developing excellently trained human resources through its academic programs
- Assisting the government in policy making and implementation through the scientific expertise available in the Institute
- Solving challenging real-life problems having societal impact
- Solving challenging real-life problems derived from the industry

All the recommendations mentioned below are with the ultimate aim of

- achieving one or more of these objectives directly,
- enhancing the resources available in the Institute so as to facilitate achieving one or more of the above objectives, and
- building accountability into the system,

thereby affecting a transformation so that ISI@100 can be the nation's pride, make an international impact, and command true global recognition.

For each recommendation, targets are to be set. Implementation should be planned and initiated in such a way that targets are met on a time bound basis. Accordingly, each recommendation is qualified with:

Immediate: Targets should be attained within a year – Requires minimal external intervention

Short Term: Targets should be attained within three years - Requires some amount of external intervention

Mid Term: Targets should be attained within five years - Requires reasonable external intervention

Long Term: Targets should be attained within ten years - Requires large external intervention

6.1 Recommendation I - Renaming/reorganization/restructuring the Scientific Divisions

[Immediate]

The RC recommends re-organization/renaming the Divisions along broad disciplines resulting in the following seven divisions

- Statistical Sciences Division
- Mathematical Sciences Division
- Computer Sciences Division

- Quantitative Economics Division
- Social Sciences Division
- Natural Sciences Division
- Statistical Quality Control and Operations Research Division

While recommending reorganization of the divisions, the RC urges that silo must be broken and collaborative work within the Institute should be enhanced. To facilitate and encourage this, the RC recommends that besides a model of preferential funding for truly cutting age interdisciplinary collaborative research, an Institute-wide collaboration task force be set up that looks at inter disciplinary activities, eliminates duplication and drives team work for bigger projects. Such a structure exists in the Policy Planning and Evaluation Committee (PPEC), but an internal task force will serve the purpose better. Moreover, recognition of excellent inter-disciplinary/divisional collaborative research through awards or certificates may also be worked out internally.

6.1.1 Statistical Sciences Division

- The Applied Statistics Division should be renamed as Statistical Sciences Division.
- The faculty members working in Statistics and Probability Theory (especially if motivated from Statistics), presently located in the Theoretical Statistics and Mathematics Division, should ideally be included in the Statistical Sciences Division. However, the RC is aware that often legacy issues arise, especially among senior faculty, during such changes. Thus, the RC recommends that the faculty members working in Statistics and Probability Theory, placed in the present Theoretical Statistics and Mathematics Division, may be given a choice to move to the newly renamed Statistical Sciences Division.
- The RC feels that Sampling and Official Statistics Unit (SOSU), which has tremendous potential and is one of its kind in India, does not fit well in the Social Sciences division. This is clear from the type of projects SOSU is executing and the type of training programs they are conducting. The RC notes that in most of the cases researchers from the present Theoretical Statistics and Mathematics Division and Applied Statistics Division are supporting the activities of SOSU, yet SOSU is placed in the Social Sciences Division (SSD). This Unit should be placed under the Statistical Sciences Division.
- Faculty members of the SQC&OR division whose primary focus is on research in Statistics and who have only a nominal interest in interacting with the industry should be brought into the Division of Statistical Sciences. For example, any faculty with a Masters and/or PhD degree in Statistics in this Division who has not undertaken any consultancy project, other than training projects, with the industry in the last ten years may also be considered for placement in the Division of Statistical Sciences.
- The Statisticians who are working primarily in some specific application areas may be considered for joint appointment in both Statistical Sciences Division and the Division of the application area, if appropriate.
- **Location and Unit:** Ideally the Division of Statistical Sciences should have one Unit in Kolkata, one in Bengaluru, one in Delhi and one in Chennai. If this turns out to be a challenge, then each Centre may have multiple Units, but each Unit should have a distinct research orientation (not just minor variations) than the other.

- **Rationale for the Recommendation**
    - It seems natural that the Indian Statistical Institute should have a preeminent Division of Statistical Sciences.
    - The discipline of Statistics is presently too fragmented into different divisions and needs to be

made more coherent for improved visibility. The Theoretical Statistics and Mathematics Division now has too few Statisticians.

- The last recruitment in Statistics in the Theoretical Statistics and Mathematics Division has been many years ago. While several recruitments have happened in Mathematics and Probability.
- Moreover, Statisticians doing purely theoretical work without any focus on applications may gradually be difficult to find in large enough numbers. Neither is it desired that most statisticians turn away from application and data. Finally, those with a legacy interest in doing purely theoretical research can, without any hindrance, continue doing so either in the Statistical Sciences or in the Mathematics Division.
- With a Statistical Sciences Division, a larger group will form, which will give Statistics in ISI more visibility. The combined research contributions will make the division an attractive destination for young and talented faculty. The larger presence as a group should provide better opportunity for interaction within and outside the faculty and a more emphatic presence of ISI in the national and international scenario in the field of statistical sciences.
- There is a related issue is broadening the scope of recruitment of bright young researchers in the division. After a thorough analysis of the state of Statistics education in India and in some of the leading Universities of USA and Europe, the RC is convinced that there is a significant gap in the demand and supply of the well-trained statisticians. And no doubt that ISI is suffering from this demand supply imbalance. At the same time, ISI has to play its immense role in addressing this imbalance through an all-out effort. It is observed that ISI has not yet fully and widely accepted the changes happening in the field of Statistics, and prefers to continue in the classical areas. A reading of the 2021 convocation address by Peter Bickel reveals the thoughts of the top statisticians of the world about the direction that Statistics is taking now.
- ISI is yet to recognize accomplished engineers, probabilists and mathematicians (who work in say, machine learning, data science, big data analytics) as its faculty in the field of Statistics. This widening of definition of expertise in Statistics is what is happening in most of the leading Universities of the world. The presentation from the probability group has also pointed out this blurred line of defining a statistician. ISI should acknowledge this changing face of Statistics and widen its scope of recruitment in order to enrich the quality of statistical research and teaching at ISI.

6.1.2 Mathematical Sciences Division

- With the naming of the Statistical Science Division, the RC feels that renaming the Theoretical Statistics and Mathematics Division as Mathematics Division seems natural. This is also in tune with the sentiment expressed recently by the division as follows:

  "The Division collectively wants to reach greater heights in all its academic activities, namely, research and training in all fields of mathematics including Probability Theory and Statistics. It is to be noted that TSMD is responsible for research and teaching in the core areas of mathematical sciences, which includes all areas of Mathematics and Statistics."

- The RC desires that the Mathematical Sciences Division achieves its aspiration of becoming the best in Mathematical Sciences.
- The RC recommends that those faculty members of this division working in Statistics and Probability be located in the Division of Statistical Sciences. However, again being mindful of the fact that legacy issues pervade in old institutions, the RC recommends that the Institute should give a choice to these

faculty members to move to the Statistical Sciences Division. If they prefer to remain in the Mathematics Division, they may continue doing so.

- Independent of their choice, future recruitments in this division should focus on recruiting brilliant researchers working in Mathematics including Mathematical Probability.
- The faculty members working in Probability, primarily motivated from Mathematics, should become part of the Division of Mathematical Sciences.
- The Applied Mathematicians working in Physics and Applied Mathematics Unit may also be considered for placement in the Division of Mathematical Sciences, unless their work is closely related to Physics.
- The Mathematicians who are working primarily in some specific application areas may be considered for joint appointment in both Division of Mathematical Sciences and the Division of the application area, say Natural Sciences, if appropriate. Otherwise, they may belong exclusively to the Division of Mathematical Sciences.
- **Location and Unit:** Ideally the Division of Mathematical Science should have one Unit in Kolkata, one in Bengaluru and one in Delhi. If this turns out to be a challenge, then each Centre may have multiple Units, but each Unit should have a distinct research orientation (not just minor variations) than the other.

- **Rationale for the Recommendation**
    - Mathematics in ISI has achieved a remarkable stature and reputation. By creating a division of Mathematics, the focus can be further enhanced.
    - The Statistics faculty in this division may choose to remain here, and continue doing their work, though ideally, they may choose to belong to the Statistical Sciences Division. However, each division should know what its strengths are. In that sense, the strength of the Mathematical Sciences division will definitely be in Mathematics, while that in the Statistical Sciences Division would be both theoretical and applied aspects of Statistics.

6.1.3 Computer Sciences Division

- The present Computer and Communication Sciences Division should be renamed as Computer Sciences Division.
- The RC feels that this division should have just one Unit in each of the locations. In case this appears unrealistic given the legacy in the Institute, the Division should be restructured along the lines of the main research directions in Theoretical Computer Science, Artificial Intelligence and Machine Learning, and Cryptology and Security. Having a large number of Units within each division essentially represents duplication of resources including staff. This definitely needs rationalization.
- The researchers in Cryptology and Security should be placed in the Computer Sciences Division. In fact, it was noted by the RC that the only unit in the recently established RC Bose Centre for Cryptology and Security is under the Computer Sciences Division. Hence there should not be any problem for these faculty members. There are some other faculty members who work primarily in Cryptology, and belong to the present Applied Statistics Unit (ASU). The RC also noted that ASU was earlier called the Computer Science Unit. Moreover, the faculty members are not generally considered as Statisticians. Hence placing these faculty members in the Computer Sciences Division should not be a problem. Nevertheless, again mindful of the legacy issues, these faculty members may be given an option to either move to Computer Sciences Division or to remain in the Statistical Sciences Division. But future recruitments of Cryptology experts should be in the Computer Sciences Division.
- Theoretical Computer Science should be the focus of the Chennai Unit in addition to Kolkata, while AI/ML/DS should be the focus in Kolkata and Bengaluru. Keeping in demand with the times, Delhi should also initiate a Unit of this Division.

- **Rationale for the recommendations**
    - The interaction of the RC with the Computer and Communication Sciences Division helped the committee to understand the strengths and weaknesses of the division.
    - The Division seems to be too fragmented with several Units doing highly overlapping research.
    - However, some of the key research areas, which the committee expected to find in ISI does not seem to be visible. This includes big data research. Moreover, the committee expects greater collaboration of this division with the Statistical Sciences Division.

6.1.4 Statistical Quality Control and Operations Research Division

- The basic objective of creating this division was to interact with the industry and carry out live, real-life projects. With time, this division is becoming more and more like the other scientific divisions, focusing more on research and teaching. While this may be fine to an extent, it is important to remember that interacting with and solving problems of the industry are equally important.
- Those faculty members of this division who are almost fully into research and teaching should ideally be placed in one of the research divisions, particularly in the Statistical Sciences Division.
- Those who continue to carry out industrial consultancy should continue in this division.
- Fresh recruitments in this division should be targeted towards scientists whose primary interest lies in engagement with the industry and industrial consultancy.
- The Council has taken a decision to discontinue the Coimbatore Unit of the SQC&OR Unit of ISI.
- The Mumbai and Pune Units should also be merged, or enhanced with a few more faculty members. The Delhi Unit of SQC&OR should be phased out. SQC&OR should continue in Kolkata, Bengaluru and Chennai, these serving the entire country if required using digital mode.
- The RC believes that a strong MSME focus needs to be adopted by the division to ensure practical translation of research to a large number of firms.
    - There is a massive need for institutionalization of quality in the Indian MSMEs that is only possible if the sector has access to practitioners.
    - Rethink is required on how to reach large number of MSMEs using digital technology. Some suggestions in this regard are to
        - offer courses digitally through MSME Ministry, and
        - run short courses in manufacturing clusters.
- There is a need to enable practical translation of research via:
    - Industry mentorship programs
    - Collaborative assignments
    - Inculcate live industry projects in the syllabus of MS and MTech courses
- The RC recommends that new faculty members recruited in this division should be required to
- spend at least 50% of their time on guiding /executing live projects
- The RC feels that a pool of retired faculty could be created in this division who can assist in teaching, developing contemporary case studies and be involved in training the new recruits
- The division needs to establish strong connect with experts from:
    - Top global Statistics and Operations Research institutes like MIT, Stanford, Harvard.
    - Recognized domestic institutes like IIT Delhi, IIT Bombay, BITS Pilani.
    - Industry bodies like FICCI, CII, MSME.

  At the moment, such connect is non-existent in this division.

- **Rationale for the recommendations**
    - There seems to be a critical problem in this division, that of co-existence of UGC and IISc scales. When ISI adopted IISc scales, faculty members of this division who bore the designations of Technical Officer, etc., remained in the UGC scales, while those who were in the Professor cadre went a notch higher to IISc scales. It is also to be noted that many of the existing scientists in this division do not have a PhD, as that was never the original mandate.
    - There is a lot of disgruntlements because of this problem.
    - However, times change and rules/policies change. Unfortunately, the divisional faculty in the equivalent categories felt victimized when the faculty categories got the enhanced scales.
    - It is expected that in future this division would be recruiting candidates with a PhD degree, and hence in the faculty categories. They would not suffer from the pay scale difference. However, along with this comes the apprehension about the willingness of the fresh faculty in this division to carry out industrial consultancy. If it so happens that industrial consultancy activities are down to essentially training people from the industry, then this division would lose its unique signature. Its relevance as a separate division will become low. However, as this point, the RC hopes that this will not happen, and future recruitments will keep this requirement in mind. Those interested in pure research and teaching should not be placed in this division.

6.1.5 Quantitative Economics Division

The two Economics Units in Delhi and Kolkata should continue their excellent work in both teaching and research. Primarily because of the strengths of these two groups, and the importance of the MSQE that is considered among the best in the country, the creation of this division seems relevant. Such a division will enable the division to grow further and be more visible. The group in Bengaluru may grow a little more in the direction of Developmental Economics. The work of the group in Bengaluru should be so designed that they are also able to get degrees from ISI.

6.1.6 Social Sciences Division

- Besides the Economics Research group, some interesting disciplines in the current Social Sciences Division, with great potential of quantitative work are in the areas of Linguistics, Psychology, Demography and Sociology. Newer areas may also emerge in future. In order to keep the possibility open, while acknowledging the fact that this group cannot be too large in the context of a limit in the faculty strength, the Social Sciences Division may continue hosting these disciplines and should try to strengthen it to the extent possible within the constraints of their assigned faculty strength. The current faculty members in Linguistics, Psychology, Sociology, Population Studies and Anthropology should all become part of one Unit – the Social Sciences Unit, Kolkata, under this division. There will be one Unit of this division in Giridih. The faculty members of this division need to be mandated to re-orient their work focusing on more quantitative, inter-disciplinary work. The new faculty, even if recruited in small numbers, must necessarily be those who are working in the interface of say {Linguistics, Psychology, Sociology, Population Studies and Anthropology} and {Statistics}.
- As economics has been able to make a separate place for themselves because of the importance of the programs they conduct, they have been placed in a separate division of their own to facilitate their growth.

- Sampling and Official Statistics Unit that is currently placed under the Social Sciences Division should be placed in the Statistical Sciences division.
- The Document Research and Training Unit at ISI Bengaluru seems to be a better fit in the Social Sciences division than in the Computer and Communication Sciences Division, as it essentially deals with the scientific principles behind organizing information. It may be placed as a separate Unit under the Division of Social Sciences. This Unit could have been placed in the Library Division, but then its academic nature would be in conflict with the service-oriented nature of the Library Division.

- **Rationale for the recommendations**
    - RC strongly feels that the philosophy behind this re-structuring should be to Merge and Multiply as opposed to Divide and Diminish. Unlike in a University where there are separate departments like Psychology, Sociology, etc., it seems unrealistic that this is possible in ISI. If these disciplines are kept as separate Units as is happening now, there is no way each will individually grow to even a minimal level. On the other hand, if one of these disciplines indeed seems to grow much more than the others, then a fresh relook would be important after at least 5 years.
    - The recruitment of faculty members in these areas should be talented academicians with strong quantitative background. The idea is to select potential leaders in these important areas, leaders who can drive the research, can build a significant group, and above all should be able to use Statistics, Mathematics and Computational Sciences as key technologies to further the advancement both in the respective domain and Statistics.
    - Such intermingling of disciplines is expected to lead to interesting collaborations. For example, it is doubtful if the faculty of the Psychology Research Unit and the Linguistics Research Unit ever considered combining their strengths and expertise to develop the field of Psycholinguistics, which is the study of the mental aspects of language and speech. It is a branch of both linguistics and psychology.
    - Such interdisciplinary areas will attract experts from cognitive neuroscience also where some faculty members of the Computer Sciences are working in.
    - The Linguistic Research Unit (LRU) has the potential to collaborate with Computer Scientists, especially in the areas of Natural Language Processing and Machine Translation, and with the Statisticians. This can be enabled through the creation of an Interdisciplinary Centre. There are nationally important application areas/projects like National Judicial Data Grid and multi-lingual government/official document processing, where the RC thinks that large government funded projects may be undertaken with expertise from Computational Linguistics and experts from AI and Machine Learning.
    - The Document Research and Training Centre (DRTC) in Bengaluru is primarily working in various facets of Data Creation, Storage, Retrieval, Knowledge Representation and Management, and Information Systems. Their expertise could be used synergistically to create, store, represent and retrieve the complex data in the other social sciences.

6.1.7 Natural Sciences Division

- The philosophy behind creation of the Natural Sciences division is again integration and consolidation. The different broad disciplines within this Division may be treated as different Units.
- The human genetics unit, who are involved in experimental biology and genetics, needs to be strengthened, adding more faculty members with quantitative background. Emerging areas of

molecular anthropology and computational/statistical disease genetics may be encouraged within this research Unit.

- Research groups in ecology and epidemiology should be another part of the Division. The other alternative is to relocate the research group in ecology in the applied mathematics group of the physics and applied mathematics unit.
- The traditional agriculture related research should be discontinued in Kolkata but encouraged in Giridih where the institute has infrastructure and the local ecosystem could be receptive to agricultural research. Availability of large farmland at Giridih is an added advantage to continue research in the field of agriculture. However, as a general policy, the institute should encourage researchers in these areas to adopt quantitative aspects in their work. In particular, future recruitments should focus on scientists working on quantitative and statistical aspects of agricultural science.
- Physics and Applied Mathematics Unit and Geological Studies Unit should also be placed in this division.
- The faculty members should come up with unique academic programs in this division, aligning them to the core strengths of the Institute.
- At a later part of this document, the RC has recommended a minimum strength for this division. It has also recommended a period of about 10 years within which the division will need to ramp up its activities significantly both in terms of teaching, research, visibility and external funding.
- After ten years, an overall appraisal should be done, and faculty strengths should be re-adjusted in proportion to the performance of the division, after catering for the basic teaching requirements.
- Thus, the division has to pole-vault to recognition within ten years, in order to strengthen its place in the Institute.

- **Rationale for the recommendations**
    - It is observed by the RC that Biological Sciences Division has become too small with the scientists working here having little coherence or focus.
    - Some of the work going on in these disciplines seems to have little quantitative aspect. Thus, the RC recommends that the faculty members should be encouraged to imbibe quantitative methods in their work.
    - Future recruitment should be made in a planned manner and carefully to give adequate stress on the main areas that the Division is recommended to focus on viz. genetics and human diseases, ecology and epidemiology and their related aspects.

The overarching theme in this reorganization and re-structuring is “Merge and Multiply” rather than “Divide and Diminish”, since the RC feels that ISI has been too much fragmented with multiple Units within each division, and over multiple locations.

6.1.8 Faculty Distribution

The RC realizes that with a cap on the faculty distribution, a perception has set in among the Institute faculty that the other divisions are eating away its resources, especially in terms of faculty numbers. This is giving rise to an unhealthy sentiment and competition amongst the faculty of the Institute that is detrimental to the overall growth of the Institute. In turn, this is leading to a narrowing of vision to “Me and no one else”, rather than “Me and you too”. Therefore, the RC feels that a percentage distribution of the faculty strength over the divisions

would help is assuaging these sentiments. Accordingly, the RC makes the following recommendations.

The ratio of faculty strength of degree giving divisions to non-degree giving division may be maintained close to 4:1. In other words, let 80% of the strength be kept for degree awarding divisions, and 20% for non-degree giving divisions. The RC recommends the following percentage distribution in the degree giving divisions, based on the current and potential teaching load:

- Statistical Sciences Division - 18%
- Statistical Quality Control and Operations Research Division - 14%
- Mathematics OR Mathematical Sciences Division - 18%
- Computer Sciences Division – 18% (The faculty recruited in RC Bose Centre on the separately created posts will be over and above this)
- Quantitative Economics Division – 12%

The following is the recommended percentage distribution in the non-degree awarding divisions.

- Social Sciences Division – 5%
- Natural Sciences Division – 15%

The RC stresses that even in the above two divisions, the new faculty recruitments should be focused so that highly potential scholars working in the interface between those sciences and Statistical Sciences are recruited. The future advertisement should lay this out clearly.

Since it is expected that faculty with Statistics expertise doing interdisciplinary work may also be recruited in other divisions, particularly natural and social sciences, and quite significantly in SQC&OR division, the overall strength in Statistics should be reasonably high in the Institute.

It is recommended that this distribution of the faculty strength across the divisions of Statistical Sciences, Statistical Quality Control and Operations Research, Mathematics, Computer Science and Economics should be reviewed and amended, if required, after about five years in 2027 by the ISI Council. The basis for this re-distribution should be the performance of the divisions primarily in terms of teaching load, research and fund generation. Sentimental and legacy issues should not be invoked if a division is not doing well. Hence it is in the interest of all the members of a division to involve themselves fully in the activities that are expected of them, and strive to attain such levels of excellence in all aspects that they can rightfully claim to a greater share of the faculty strength.

Starting from 2032 onwards, every ten years, the overall distribution across the Institute (including the Social and Natural Sciences divisions) should be reviewed and re-adjustments made based on the performance of the divisions. Hence this is a challenge also to the smaller divisions to put the acts together, and establish themselves in forefront areas of research.

6.2 Recommendation II - Creation/continuation/discontinuation of Centres

[Immediate]

Besides the divisions, the RC recommends that the following Interdisciplinary Centres should be strengthened/created in the Institute for enhancing productivity and interdisciplinary work:

6.2.1 RC Bose Centre for Cryptology and Security

[existing]

The RC noted that this Centre was set up by the Central Government in ISI to become the hub of teaching and research in Cryptology and Security in India. It has a few positions created specifically for the Centre, though in almost all its functions, the Centre is supported by the ISI. The Centre already runs several training programs as well as an M. Tech. course in Cryptology and Security. The Centre has deep expertise in these areas, particularly in Cryptology. It has several externally funded projects running. The RC feels that in the light of widespread digitization and associated cyber vulnerabilities, the Centre should focus on cutting edge work in the areas of Cybersecurity and IoT. New recruitments should be targeted towards these areas, and that should be adequately advertised. Presently the expertise is more towards Cryptology.

6.2.2 International Statistical Education Centre (ISEC)

[existing]

This Centre, established by Mahalanobis himself, has given commendable service to the third world. It is an Associate Institute of ISI. However, the RC found it unfortunate to note that over a period of seventy years, ISEC has not re-invented itself. The RC made the following observations:

- Over the years, the ISEC was happy to offer routine low-level statistical training for more than sixty years to government officers. Unfortunately, ISEC never went beyond this while there was potential to attract government and non-government officials from the other developing and even developed countries in the niche areas of statistical sciences and its applications. The number of students in ISEC programs is typically restricted to between 15 and 20 with the funding from the MEA. No attempt was made to go beyond that. No attempt was made to connect it to other funding platforms, funding through different government exchange programs, funding through other learned societies, etc.
- Overall, because of the lack of vision and mission to scale up, ISEC has failed to make a dent in the academic world in India and abroad, though having a very long track record of training foreign students and officials in India.

Therefore, the RC suggests the following:

- An extensive planning, brain-storming and introduction of a set of high-level domain specific courses in Statistics and related sciences so that the reach of ISEC can be increased to a significant extent.
- The use of digital media for content delivery and use of e-learning resources could be some important vehicles for ISEC to enlarge its reach.
- The duration of the current diploma program may be extended so that non-sponsored foreign students can join this program and use this diploma as an effective career enhancement option.

- The RC recommends that ISEC should make a sincere attempt to become a hub of training and statistical consulting activity in the SAARC region. It should definitely tie up with the Statisticians and Computer Scientists of the Institute in this effort.
- However, the RC is also aware that often the faculty members are unwilling to take up responsibility in ISEC, even to teach in the ISEC programs.
- It is recommended by the RC that at least five faculty members from the Institute, on rotation basis, be deputed part time to ISEC for a two-year tenure. This should be staggered so that about 40% of the deputed faculty completes their tenure each year, while the remaining continues till the next year.
- For the duration that a faculty is deputed in ISEC, his/her teaching load in regular ISI programs may be reduced to half the normal load, unless the person does not want so, or there is a grave necessity in the Institute. Service provided in ISEC should be recognized and taken into consideration during career advancement and institutional support, like academic leave, to the faculty.
- In case a faculty takes the normal recommended teaching load in the Institute, and also teaches a course in ISEC, then the faculty may be remunerated from ISEC funds as per Institute rules and norms evolved by ISEC (based on the funding received for conducting the program in ISEC).
- The funds generated by ISEC should be kept in a separate account, and used for the activities of ISEC, for inviting international visitors, and such similar activities.
- The RC recommends that ISEC must become totally self-sustaining within 2025.

6.2.3 Technology Innovation Hub and IDEAS Foundation, a Section 8 Company

[Recently set up]

This is a welcome development in the Institute with faculty members of many Units and Divisions coming together for a common cause. The RC hopes more such structures will get created in the Institute. In particular, the RC would like deeper and more visible participation of Statisticians and Mathematicians to participate in, and lead such initiatives.

6.2.4 Centre for AI and ML

[existing]

The Institute, in response to the need of the hour, created this inter-disciplinary Centre. It is a good development as it creates a platform for faculty and students of different divisions to come together for a common academic or research activity. Such initiatives should be emulated.

CAIML members should make utmost effort to increase their activities so that CAIML gets national visibility as well as international reputation. They should take up large interdisciplinary projects. CAIML should position itself in tune with the National Policy on AI.

6.2.5 Centre for Soft Computing Research

[existing]

This centre, an associate institute of ISI, played a major role for about ten years in the popularization of soft computing research in India from 2005 onwards. It was set up with DST funding which has now been stopped for about five years. Presently, the Centre is surviving primarily with the resources (space, faculty, staff,

students, other infrastructural support) of ISI and a few externally funded projects of the faculty deputed there. Presently, the three faculty members deputed there are all from the same research Unit in ISI. The RC felt that this Centre has served its purpose, and should now be either merged with CAIML or with the parent Unit/Division.

6.2.6 Centre for Research on Economics of Climate, Food, Energy and Environment

[existing]

This is a Centre in ISI Delhi, primarily run by some faculty members of the Economics and Planning Unit. The RC is of the opinion that this Centre is already creating a space for itself internationally, with a substantial amount of foreign funding flowing in for a variety of projects. Hence this Centre should be further strengthened, with the support of more faculty members as well as visiting scholars. The Centre should not only become self-sustaining in all its activities, but should also be generating surplus resources.

6.2.7 Interdisciplinary Centre for Applied Statistics and Biostatistics

[to be created]

The RC strongly believes that ISI should have a Centre of Excellence in Biostatistics and Applied Statistics. Many Universities around the world have created departments of Biostatistics. It is not yet time to do so in ISI, since the critical mass has to be first formed. Nevertheless, the need for outstanding work in Biostatistics is critically felt, and ISI should take leadership in this effort. At the very least, it should have members from Statistics, Mathematics, Computer Science and Biological Sciences (particularly those working in Human Genetics Unit) working side by side. The Centre should also have members from Social Sciences like Linguistics, Psychology and Demography for enhancing cross-disciplinary work.

6.2.8 Statistical Consulting Centre

[to be created]

The RC suggests that a Statistical Consulting Centre (StatCC) should be immediately started in the Institute under the leadership of a leading Statistician or a Statistics practitioner. The Centre should engage with both internal and external entities for training as well as consultancy purposes. In particular, StatCC should target to become a hub for obtaining paid statistical services in the SAARC, African and Central Asian regions. In this context, the RC recommends that this hub could be a joint endeavor of ISEC and StatCC, since ISEC already has a reputation in these regions due to its long running Statistics diploma program. The RC expects that in no time StatCC will not only be self-sustaining but also bring in important external projects and the much-needed visibility.

6.2.8 Research Centre for Economics and Data Analysis

[to be created]

The RC is aware that in the past the Economics and Planning Unit has undertaken research activities funded by an endowment from Planning Commission/NITI through Planning and Policy Research Unit (PPRU). The RC is also aware through the representative of NITI Aayog to the ISI Council that NITI is willing to come together with the Economics and other units of ISI dealing with Data Analytics to help raise a corpus - from Government Ministries, Multilateral Agencies as well as the Private sector - to open a Research Centre for Economics and Data Analysis, based out of the ISI Delhi Centre due to the proximity to NITI. This will help to raise the capacity to do policy relevant research for India. Such a research centre will work on issues close to NITI's mandate as well as basic research for study of the Indian economy. These funds can also be used to increase capacity by funding PhD students and post doctoral students for policy work.

6.2.9 Centre for Language Science

[to be created]

On noting the presence of the Linguistics and Psychology Units, as well as a strong group working in Language Technologies (like NLP etc.) in the Computer Sciences Division, and the presence of Statisticians as well as the Document Research and Training Centre in the Institute, the RC is of the view that a Centre for Language Science will flourish in the Institute if led properly. This Centre should not only take leadership in developing language repositories, but also develop areas like Psycholinguistics, document analysis, etc. Such a Centre can also take up large-scale, interdisciplinary projects like digitization and analytics of judicial documents of the country.

6.2.10 Inter Institute Centre for Mathematical Sciences

[to be created]

A very interesting proposition has been made to create a Centre for Mathematical Sciences in the lines of MSRI, Berkeley, Banff International Research Centre, etc. While the RC strongly feels that such a centre can play a critical role in the ecosystem of the country, it also feels that like the international organizations referred to, this will succeed only if several institutes have a stake in it. The RC recommends that a few mathematicians in ISI with strong commitment should take a lead, involve mathematicians from other institutions and create a passionate group committed to this idea. Once this group is created, they should go all out to attract funds from their respective institutions, the government, other agencies, the private sector as well as from philanthropic bodies. ISI can host such a centre physically (if it materializes, it should be located in Kolkata), but its entire funding and administrative structure should be independent of the Institute.

6.2.11 Other Administrative Centres/Cells

The RC also noted some administrative cells created in the Institute for specific academic purposes. These are:

- Cell for Collaboration with Academia, Industry and Research Labs (CCAIR) – which handles and facilitates externally funded research and training programs.
- Faculty recruitment cell – to handle the administrative aspects of faculty recruitment.

- PhD-DSc cell – to handle the administrative aspects of award of PhD degrees.

In this context the RC makes the following recommendations:

- The RC strongly recommends the evolution of the CCAIR into an independent office with its administrative and accounting setup separated from those of the Institute. This office will be handling work related to all externally funded projects and programs. The office of the Faculty In-Charge of CCAIR may be later converted to the office of Dean, CAIR. The RC was disappointed to note that the administrative and accounting support required for smooth running of externally funded projects was of low quality, requiring a lot of intervention by the faculty at multiple levels. The RC acknowledges that this can be a real disincentive in getting external grants. Hence the Institute should strive to have more dedicated manpower towards these works at the earliest convenience.
- The RC has noted that the level of technology transfer and patenting is very low in the Institute. The culture of incubating start-ups is non-existent. This is certainly not in tune with the times. The RC therefore recommends strongly that the following be set up without delay in the Institute:
    - IPR and Patenting Office – as a part of the Legal Cell
    - Incubation Centre
- The RC recommends that in parallel with setting up these structures, appropriate policies should be finalized, taking cue from other Institutes that have done so successfully – like some of the IITs and IISc. Incentivization, while protecting the interests of the Institute, is imperative in drawing up these policies in a balanced way. In particular, for incubating start-ups, the Institute should be careful that these are based on solid research ideas. Routine, non-intellectual endeavors should not be encouraged.

6.3 Recommendation III – Faculty Recruitment and Promotion

[Immediate]

6.3.1 On Faculty Recruitment

- It is well-known that an institution is only as good as its human resources.
- An academic institution is defined by the strength of its faculty. The faculty's activities are to a large extent determined by the quality of the administrative support it receives.
- The RC has observed that in most cases, the quality of faculty recruited in the Institute has been at a high level in their subject areas.
- However, it has been brought to the notice of the RC multiple times that the recruitment process takes a long time, sometimes running into a year.
- The RC believes that a quick decision-making in recruiting bright young faculty is an absolute requirement. At the same time the committee understands the complexity and the layers of scrutiny involved in a faculty recruitment process.
- The RC also believes that this is essentially an internal matter of the Institute. The Institute should itself find ways to expedite the process.
- Nevertheless, the RC recommends that the faculty recruitment process must be completed within three months from the last date of submission of applications.
- Moreover, the RC recommends that each advertisement for Faculty Recruitment must spell out the areas of interest that the Institute is looking for. Recruitments must be planned in such a way that the interdisciplinary research that is still at a less than desired level in the Institute is enhanced. At the same time, the new recruits should be able to teach a reasonable mix of core and optional subjects.

- It is noted that many faculty members of the Institute have been students/scholars in the same Centre of the Institute. Such inbreeding should be discouraged as far as practicable. In case it becomes necessary to make such offers, effort should be made to at least place a faculty in a centre of the Institute different from where he/she got his/her degree from.
- Under no circumstance should faculty recruitment be made in the Institute unless the person has spent at least the preceding three years in another reputed institution/organization. The Director may be empowered to make exceptions, albeit sparingly, only in the case of candidates from the reserved categories and women candidates.
- Finally, on Faculty Recruitment, the RC recommends that in line with TIFR and IISc, the entry level Assistant Professors in the Institute should be offered either contractual position for a fixed duration (for those with less than three years post-PhD experience), or tenure-track positions (for those who have three years post-PhD experience). The latter recruits become tenured only on promotion to Associate Professor positions. The maximum tenure for Assistant Professor position should be kept at eight years, and the maximum number of attempts an Assistant Professor can take for being promoted to Associate Professor is to be kept at three. An Assistant Professor, who fails to secure the promotion to Associate Professor within the specified limits is asked to leave the Institute. The RC recommends that recruitments should follow this policy from 2022 onwards or at the earliest possible thereafter.
- Although the RC realizes that this will put pressure on the young members of the faculty, it has also observed that this policy of tenure track has served the respective institutions well around the world and also in India. A sense of security prevailing from almost the beginning of one's professional career has seen to breed laxity and reduce innovation. This is not good for an institution that is striving to be the best in the world.

6.3.2 On Faculty Promotion

- Recommendations on some minimum work norms are mentioned elsewhere, under teaching, supervision, academic administration and sponsored research.
- Meeting the minimum work norms makes a faculty member eligible to be considered for promotion – it does not guarantee promotion.
- The RC wants to remind the faculty members that being promoted to a higher position also means taking higher responsibilities in the Institute. In particular, at higher positions, the faculty member is expected to take more administrative load in the institute, and to bring in larger grants, in addition to doing his/her usual research and teaching. Often the opposite happens. This is totally undesirable in an Institute that aspires to be the best.
- The RC therefore strongly recommends that the Institute should initiate a process of Annual Performance Appraisal of the faculty. If a faculty is found to be underperforming continuously in three consecutive years, he/she should be warned. If the faculty member does not improve his/her performance in the next two years to the satisfaction of the competent authority, the option of Voluntary Retirement from Service be offered to such a person. The Council of ISI should work out a suitable mechanism to implement this recommendation.
- The RC understands that the research publications seem to be the sole criteria for faculty promotions, with the other activities of the candidate being given only a nominal consideration, if at all.
- The RC strongly recommends that this process needs to change.
- The Institute should insist on minimum levels of
    - Teaching load
    - Research supervision

- Extramural research funding/consultancy projects OR service to the government which may not have generated revenue but required substantial time of the individual (participation in selection committees, etc. should not count towards this)
- Academic administration.

before considering a faculty for promotion.

- The RC is aware that such benchmarks were developed by a specially appointed committee, but could not be implemented for a lack of consensus.
- The RC has noted that many such issues, which may not be to the liking of a section of the faculty, get blocked in the Institute and cannot be implemented.
- The RC is therefore of the opinion that all faculty promotions should be kept on hold, and re-started only after adequate work norms have been put in place.
- Realizing that this may be harsh on those waiting for their promotions, the RC sets the Institute a deadline of December 31, 2021 for implementing faculty work norms. In case, the work norms are still not in place, the promotional process should be kept on hold till those are put in place.
- Though the RC is unwilling to try to micromanage affairs of the Institute, which should be left to devise its own adequate parameter values, it recommends that to be considered for promotion, a faculty member since his/her last promotion (or, joining the Institute whichever is later) must have met the minimum teaching load of one course a semester in at least 80% of the semesters, has supervised PhD students, has received extra-mural funding and has provided substantial service to the Institute. A less than desired contribution on one parameter should be adequately compensated by more than desired contribution on another parameter. Repeated refusal to provide institutional service and refusal to teach should be viewed very seriously and adversely during promotional reviews.
- Only after the basic functional norms are met, should promotion be considered, which naturally would thereafter take into account the excellence in research, teaching and other parameters of the applicant.

6.4 Recommendation IV – Human Resources

[Immediate, Mid Term and Long Term – see below]

6.4.1 Faculty

- In all the presentations that the RC has heard, the common challenge faced by the Institute that has been consistently touched upon by all is the suddenly imposed cap on the faculty strength to 273. This seems to have hurt the interest of the Institute the most.
- The RC strongly felt that for the Institute that has four Centres besides the Headquarters in Kolkata, one branch and several outlying Units, the cap of 273 is insufficient.
- The RC recommends that the minimum strength of any Division should be 20. Since the minimum recommended percentage strength is 5% (see Section 6.1.8, *Recommendation I – Faculty Distribution*), and considering this to be 20, the minimum strength of the Institute should be 400. This value may be reviewed after 10-15 years.
- The RC also recommends that the minimum faculty strength of a Centre of ISI should be 25 or more. No Centre can flourish at strength lower than this.
- However, at the same time the Institute should show a faculty to student ratio (considering only students of AC approved degree/diploma/certificate programs of at least six months duration) of at least 1:8. It ideally should go to 1:10.

- Presently this is of the order of 1:4.
- The RC recommends that the government presently revise the cap on the faculty strength to 300 unconditionally, even though the number of students is not commensurate at this point of time. This needs to be done for the immediate survival of the Centres in the North-East and Chennai and the branch in Giridih, and for some very small Units, as well as for implementation of reservation. **[Immediate]**
- Moreover, at least five of these additional (300-273=27) positions should be reserved for recruiting faculty who are working in the area spanning an existing discipline in natural and social sciences with specialization in Statistics, Mathematics and/or Computing.
- The RC recommends that the government should revise the maximum faculty strength to 350 when the teacher to student ratio reaches 1:8. The government may consider maximum 50% of the additionally sanctioned strength (i.e., maximum 25) for contractual faculty appointments at same scales and allowances as regular positions, but without any long-term commitments. **[Mid Term]**
- The RC recommends that the government should revise the maximum faculty strength to 400 when the teacher to student ratio reaches 1:10. The government may consider maximum 50% of the additionally sanctioned strength (i.e., maximum 25) for contractual faculty appointments at same scales and allowances as regular positions, but without any long-term commitments. **[Long Term]**
- The approved faculty strength should then be tied to the number of students being graduated by the Institute in the ratio 1:10.
- Each Centre independently should also strive to attain a faculty to student ratio of at least 1:8 in the long run.
- The RC wants to emphasize that
  - (i) that teaching is as much a part of a faculty's job description as is research,
  - ***(ii)*** many other institutes have ratio worse than this, yet continue to do good quality research,
  - ***(iii)*** the ratio is an average over the Institute. It is possible that for some disciplines the ratio will be better, and for some others the ratio will be worse.

6.4.2 Non-Faculty

The RC has reviewed the non-faculty (that includes scientific, technical, administrative and accounting staff) strengths in the Institute. It is informed that currently the non-faculty strength is capped to 757. The Institute workers demanded that the non-faculty strength should be fixed to 852, the value that was recommended by the third RC.

This RC recommends that capping the non-faculty strength to 757 is appropriate for the Institute. With the government focus on outsourcing of services, the requirement of dedicated manpower is less. The RC feels that given the nature of the Institute, which is spread, over multiple cities of the country, 757 support staff is a reasonable number, and it should not be reduced further. This value can be reviewed after a span of five years.

The RC felt that the allocation of human resources is uneven and often not conforming to work norms. The RC recommends that the Institute should get the work-load carefully evaluated by either itself or by a professional agency, and accordingly place its human resources appropriately so that the work load is more or less evenly distributed across the different centers and the different offices. **[Immediate]**

6.5 Recommendation V –Teaching Activities

[Immediate, Short Term]

- The RC is alarmed to note that some faculty members refuse to participate in teaching activities with the understanding that teaching is not a mandatory job of an ISI faculty member. In some other cases, faculty members deny to teach subjects that are outside the domain of their research.
- It has been expressed that the Dean of Studies has no authority to enforce teaching or other academic duties on any faculty member, and has to essentially rely on their willingness. This works in most cases, but sometimes the Dean faces problems of enforcing his instructions.
- It was also mentioned to the committee that quality and quantity of teaching was never considered as an important criterion in evaluating a faculty member for promotion. As a result, the role and responsibility of teaching primarily becomes optional and voluntary.
- It was confirmed from the existing Category Manual of the Institute that teaching is included in the job description of a faculty member. Hence the notion that teaching is voluntary needs to be dispelled immediately.
- It is true that in all Institutes there are sometimes a few faculty members who find it uncomfortable to teach subjects beyond their core area of interest. However, if this number becomes significant, then running teaching programs, and offering enough courses to the students would be a problem.
- Moreover, year on year, such faculty members will get away with teaching only the subject he or she is most comfortable with, irrespective of the need of the Institute.
- Sometimes for some very specific reason, a faculty member may seek exemption from teaching duties. However, this can only be an exception, not a rule.
- Finally, the RC observed from the presentations of each scientific division that even where the faculty members claimed that teaching was very heavy, the actual teaching load turned out to be well below one course per faculty per semester. This is way below the teaching load at most other institutions in the country.
- The plea that ISI is primarily a research Institute and that teaching hampers research activity are unacceptable by the RC. Teaching has been found to complement research. Most top Universities around the world, which produce high quality research output, also have a minimum teaching load.
- Moreover, being employees of the Institute, individuals have to place the needs of the Institute above their needs.
- The RC notes that with a faculty size of more than 250, the Institute on its own should have set a target of 2500-3000 students.
- Currently, ISI has around 1000 students, including PhD scholars. The RC recommends that the Institute should make efforts to increase the student strength to 2000 within 2025, 2500 within 2027 and 3000 within 2030.
- In order to increase the student strength to 3000, it is evident that not only would all faculty members need to participate in teaching, they also need to teach larger classes. Class sizes in ISI have traditionally been small.

6.5.1 Mandatory Teaching

- In this backdrop of the above observations, the RC reiterates that teaching is a mandatory activity and under no circumstances a faculty member can avoid teaching responsibility.

- The Committee recommends that a benchmark of teaching one course in a regular teaching program (degree/diploma/certificate programs) per semester should be the minimum teaching responsibility of a faculty member, with preferably one of the two courses in a year being a compulsory course in the general area of training of the faculty member.
- The graduate level reading courses and lectures in institute workshops/training programs and the likes should not be considered as formal teaching and should not be counted in this teaching load. The Dean of Studies may allow some exceptions, but such exceptions should remain exceptions, and not the norm.
- The RC reiterates that academic council must ensure formal teaching opportunity for all its faculty members.
- It is also recommended that a faculty member must be prepared to teach a reasonable number of compulsory and optional courses that are outside their core research areas. In case required, a faculty member may be alerted to the possibility of teaching a course at least a semester in advance, providing him/her sufficient time to prepare the subject as may be required.
- The RC heard a common refrain from the faculty members of the divisions of natural and social sciences that their teaching possibilities are limited, since the ISI Act bars them from giving degrees.
- The Institute has to find ways of enabling these faculty members to offer degree/diploma/certificate programs as well. Without the capability of offering degrees themselves, a general disenchantment has set in, which is not good for the well-being of the divisions.
- The matter about amendment of the ISI Act will be taken up in a separate section.
- In this context the RC also recommends that particularly in such disciplines where the Institute is currently not able to provide the faculty sufficient teaching opportunities, the faculty members may be allowed, say for a day per week, to teach in another university or college or some appropriate institute as part of their duty. These are to be counted towards the teaching load of the faculty.

6.5.2 Advance Course Allocation

Thus, it is recommended that teaching allocation be done a semester in advance. For example, for the semester starting from July 2022, the course allotment should be completed by January 2022, and for the semester starting in January 2023 the course allotment should be completed by July 2022. Also, courses should be so distributed that no faculty members should be teaching very small classes of less than 10 students year after year.

6.5.3 Power to Dean

- It is recommended that the Dean of Studies will have the authority to assign any lawful and reasonable duty/function related to running of the academic programs of the Institute to any member of the faculty, commensurate with his/her position. It will be expected that the faculty member will perform such duties/functions unhesitatingly.
- In the rare case that a faculty member fails to carry out the assigned duty, the RC recommends that the Dean of Studies will have the authority to officially seek explanation from the concerned faculty member. If dissatisfied with the response, the Dean may forward the same to the higher authority, with his/her comments for further action as considered appropriate by the higher authority.

- Naturally, in an academic setting it is expected that all faculty members will consider participating in the academic programs of the Institute as one of their main duties, and will extend full cooperation. Thus, need for stern actions should be extremely rare.

6.5.4 Statistical and Quantitative Aspects in Natural and Social Sciences

The faculty members in the disciplines of natural and social sciences should remember their positioning in the Indian Statistical Institute. Hence the programs that are offered in these divisions should have a unique quantitative flavor, with liberal sprinkling of Statistics, Mathematics and/or Computer Science. At the same time, it should cover enough subject matter so as not to disadvantage the students in the job market. Thus, a lot of thought and innovation needs to go into the design of the programs.

6.5.5 Fast/Agile Decision Making on Academic Programs

The RC recommends that the Academic Council should be agile and willing to accept new ideas, so that new programs are offered not only in time, but actually ahead of time, something that ISI was known for in the past, but not anymore in the present.

6.5.6 Enhancing Existing Programs and Introducing New Programs

The RC recommends that the Institute should

- Start a full M. Stat. in Delhi
- Upgrade the diploma programs in the North-East and Chennai to degree programs
- Double the intake of M. Tech (CS) program
- Start Bachelors programs in collaboration with reputed colleges/institutes (e.g., IISERs, St. Stephen's College Delhi, Presidency University Kolkata, Loyola College Chennai, Fergusson College Pune, etc.).

Some programs, which are conspicuous by their absence, and should be initiated at the earliest, are:

- Bachelors program in Computational and Mathematical Sciences
- Master's Program in Data Science
- Executive Development Programs in Several Areas of Interest to the Institute.
- Keeping the tradition, the committee recommends introduction of postgraduate programs in Bio-Statistics, Medical Statistics, informatics or Geo-Analytics, Quantum Computation or Quantum Information.
- Every new program should have a mechanism of periodic review that would decide on the format and continuity of the program.

6.5.7 Fixed Term Teachers

The RC recommends that ISI should introduce a system of offering fixed term teaching positions to promising Statistics faculty in Indian universities, protecting their salary. Also, ISI should introduce a similar system for recently retired Statistics professors from the Institute or elsewhere, whose expertise may be fruitfully utilized

in the Institute. ISI should make at least five such appointments each year.

6.6 Recommendation VI – Adoption of Digital Mode for Teaching and Training

[Immediate and Short Term]

- It is clear that the Institute needs to increase its intake in all its academic programs, especially the B. Stat. and B. Math. programs. In case the class size becomes larger than what can be accommodated, the class may be divided into two sections. However, in order not to unduly increase the teaching load, mechanism for having the teacher in one classroom, and a section of the students in another classroom with streaming of the lecture should be adopted. The RC understands that such infrastructure is already created in the Headquarters of the Institute, when class sizes need to be restricted because of the requirement of social distancing for covid-19. This should be replicated in the Centres.
- India is a vast country with a huge demand for trained manpower. Many students spread all over the country in colleges, Universities, in cities, small towns and villages, would benefit immensely if they are taught by the best of teachers that an Institute like ISI has to offer. However, this is realistically not possible. But what is possible is to reach out to this large mass of students, with the best content delivered by the best teachers through widespread adoption of technology. This may not be as good as in-class experience, but is definitely a very good option, when the best option is infeasible.
- The RC recommends that ISI should adopt digital technology in a big way, and start a number of online degrees, diploma and certificate programs especially in Data Sciences. This would require intense training in Statistics, Mathematics and Computer Science, all areas of deep expertise in ISI. The RC recommends that the Institute should target to create 10 excellent introductory online courses, which can be used by the universities.
- This will require a one-time heavy involvement of faculty time for creating the content, but numerous re-utilizations of the content are easy to achieve.
- The RC recommends that a one-time grant be provided to the Institute to enable it to build the necessary infrastructure and the content for such online programs.
- By charging fees on these online courses especially, if this culminates in the students getting degree/diploma programs, the Institute can also earn revenue. At the same time, a generous revenue sharing model can also earn revenue for the teachers who opt to offer online content.
- Through innovative ways, some in-class or one-on-one interaction can also be organized for the students who take the digital courses.
- If such programs are opened internationally, and they are made interesting and useful, the reach of the Institute is likely to increase 100X. It would then make a real difference to the national scenario as well, especially in Statistics, Data Science and Big Data Analytics.

6.7 Recommendation VII –Research Supervision

[Immediate]

- The RC noted with disappointment that the number of PhDs produced by the Institute is much smaller compared to those in comparable institutions.

- This is a matter of great concern, since supervising PhDs is a way of training the next generation in the highest level of research.
- It has been mentioned that the Institute admits about 60-65 scholars every year, and this number is restricted by the amount of funds available.
- The Committee was told that the Institute charges no tuition fees from the scholars. In fact, there are no tuition fees even in the undergraduate and post-graduate programs, barring one tri-institute diploma program. On the contrary, the Institute pays stipends and fellowships in almost all long-running programs.
- It has also been brought to the notice of the RC that several external fellowship holders (e.g., CSIR, UGC, etc.) find it difficult to get their degrees from ISI, even from the degree awarding disciplines, since the PhD admission process in ISI is tightly regulated.
- In this backdrop, the RC recommends that each faculty must produce at least one PhD in every six years on an average. Producing at least two PhDs must be mandatory for promotion to the post of a full Professor, and producing at least one PhD after becoming Professor should be mandatory for getting promoted to HAG Professor. Norms may be relaxed only in a few exceptional cases; but that should be few and far between.
- Since the faculty members have not been prepared for this general norm, the requirement may be kept at a minimum of one PhD student till 2025 for promotion to the post of full Professor, beyond which the minimum requirement should be two PhDs produced.
- It is strongly recommended that the Institute reviews its PhD admission process so as to enable those getting fellowships from external sources, obtained through some national level competition, can get admitted through a simpler process.
- In particular, the RC strongly recommends that the Institute open a channel for sponsored candidates from government and industry to get admitted to the PhD program through a simpler process, and a system be put in place so that they can meet the degree requirements (e.g., residency requirement can be relaxed, weekend classes can be organized). These candidates not only gain from the Institute, the Institute will gain from them as they have a finger on current needs of the industry and problems arising out of live situations.
- Moreover, introducing tuition and related institutional fee for PhD scholars, and a PhD registration fee commensurate with the expenses, is imperative.
- While the RC agrees with the principle of ISI that no one should be denied an opportunity to study in the Institute for lack of finances, there are other ways of ensuring this. Providing adequate waivers and support to those who really need it, but charging appropriate fees to those who can pay is the way to go. The target should be to make each program self-sustaining to as large an extent as possible. This will free up resources that may be then used for the overall development of the Institute.

6.8 Recommendation VIII – Academic Administration

[Immediate]

- Academic administration is part of a faculty member's responsibility. It is therefore expected that all faculty members will carry out duties of academic administration as assigned by the Institute from time to time.
- In particular the full Professors and Professors in HAG scale are expected to take significant administrative responsibilities for smooth functioning of the Institute.

- The competent authority should engage more the senior faculties in academic administration as far as possible, allowing junior faculty members more time for research and teaching. All should appreciate that smooth functioning of an institute largely depends on collective contributions and commitment at different levels.
- Repeated refusal to do duties assigned by the competent authorities should be viewed seriously. The RC recommends that non-statutory benefits like CPDA, internal project funding, academic leave, etc., be linked with performance of the faculty members in teaching and academic administration.

6.9 Recommendation IX – Administrative Reforms

[Immediate]

The RC noted that the Institute needs to urgently bring in several reforms in the administrative mechanisms in order to enhance efficiency and incorporate more transparency in the processes. This will not only lead to better utilization of resources, but will help in reducing general dissatisfaction among the workers. Therefore, the RC makes the following recommendations that it thinks merits immediate attention.

6.9.1 E-Governance

- The RC was surprised to note that ISI has very rudimentary e-governance. Operations still continue to be done physically on files.
- The Review Committee strongly recommends that immediate steps should be taken to establish an efficient e-governance system in the Institute. This should be done by hiring of professional services from expert agencies.
- This entails a major expenditure of several crores, but is an investment that needs to be made immediately and without delay.
- In fact, the RC recommends that for a start, the Internal revenue generated by ISI in 2020-2021 be allowed to be spent by the Institute on this activity, while the government releases its proposed budget to the Institute.
- If the Institute seeks this amount from MoSPI as an additional grant, then it is possible that MoSPI would have to seek the approval of the Ministry of Finance. However, if MoSPI allows the Institute to use its internal resources for this purpose, while MoSPI releases its Budgetary Estimates to the Institute already approved by the Ministry of Finance, then there may be no need to go to any other authority for further approvals.
- Regarding streamlining of accounts and administration for smooth handling of external grants separate recommendations have been made elsewhere.

6.9.2 Brand Building

This is another area the Institute has never focused much on. It will be beneficial for all stake holders, the Institute being one of them, if the services of a professional agency are hired for the purpose of brand building. The Public Relations Unit existing in the Institute should be enhanced with a person trained to do PR all the year round.

6.9.3 Staff Training

- The RC has several times heard complaints about administrative inefficiencies. It therefore recommends that large-scale training and development programs should be conducted for the staff, especially in
    - computer operations
    - communication skills

  At the end of the training, a certificate must be obtained by the staff member. For promotion of the staff members, a minimum number of certificates of completing such development programs must be demanded, besides the usual eligibility conditions.

6.9.4 Additional Offices of Academic Administration

- The RC recommends enhancing transparency of Institutional systems through availability of online information as far as practicable. The Institute should try to identify the contents of a majority of the RTIs and grievances, and see whether these could be addressed by making more information available as far as practical, without compromising the sanctity or confidentiality of the processes. The grievance redress mechanism should also be strengthened.
- The RC recommends setting up additional Dean's offices or Cells for smooth functioning of various activities. These are:
    - Office of the Dean of/Cell for Faculty Affairs – the currently existing Faculty Recruitment Cell should become part of this office
    - Office of the Dean of/Cell for Alumni, Corporate and International Relations
    - It has already been mentioned elsewhere, the Cell for Collaboration with Academia, Industry and Research Labs (CCAIR) should be made more independent. The Faculty In-charge of CCAIR should be delegated more powers to handle sponsored research. This office must be enhanced significantly with its own administrative and accounts set up to handle with all external funds and ultimately restructured as Office of the Dean, CAIR (without election). A Monitoring Committee should be set up within CCAIR with the Faculty In-charge as the Chairperson and one faculty from each division as members, who would be monitoring the level of individual and collaborative research happening in the Institute through CCAIR, and would be tasked to prepare a brief report each quarter to be submitted to the Director for presentation to the Council and to be compiled into the Annual Report of the Institute later on.
    - The legal cell should be expanded with an IP/Patent Advisor.

6.10 Recommendation X – Revenue Generation, Course Fees and Universal Scholarship

[Immediate, Short Term, Mid Term]

The RC recommends certain targeted measures for revenue generation that should be adopted by the Institute at the earliest.

6.10.1 Through External Grants and Consultancy

[Short Term to Mid Term]

- The RC strongly supports internal revenue generation by the Institute. From the interaction with the institute administration and faculty members, it has emerged out that ISI is in the process of increasing its effort towards attracting external grants for research and consultancy, and generation of internal earnings. These two together presently stand at about 8% to 10% of the Grants-in aid received from the government.
- The RC feels that ISI has a huge potential in this context and ISI should have a target of doubling the percentage of external grants and internal earning in the medium term. Thereafter, the target should be to reach to at least one third of the Grants-in-aid. The RC recommends that the institute should devise a set of target-oriented policies in order to achieve this.
- The RC recommends that the policy for facilitating internal revenue generation should be multi-level.
    a. The institute should create a strong and smooth eco-system for enabling flow of external funds.
    b. As it emerged in different interactions, the institute administration, especially Accounts, should gear itself to create a quick, approachable, responsive and professional attitude in handling external funds. A ninety-year-old institute with legacy system may not be in a position to handle that. On the other hand, the management of these projects and related services need thorough and time-bound planning.
    c. The RC therefore recommends creating an independent administrative and accounting unit for handling external funds under the overall umbrella of the Cell for Collaboration with Academic, Industry and Research Organizations (CCAIR).
    d. The RC recommends that while just a few staff of this setup should be regular staff of the Institute, the majority should be hired on contract from the internal resources generated from such external grants. The persons hired in this Unit should have the professional capability and expertise to handle external grants.
    e. In addition, the Institute should create a contractual position for a professional who will monitor the funding opportunities available, and will regularly keep the faculty aware of such opportunities. The person will also be an expert in creating funding opportunities for the faculty by maintaining liaison with the funding agencies as well as with the industry.
    f. However, nothing will succeed unless the regular faculty members are motivated to take up external work in sufficient volume.
    g. The Institute therefore should evolve liberal revenue sharing rules between the faculty members and the Institute.
    h. Moreover, ability to bring in external grants needs to be a one of the criteria for career advancement.
    i. The immediate target that the Institute should set itself to achieve by 2025 is to have at least 50% of the faculty holding external projects/grants at any given point of time. This percentage should thereafter go up to at least 75% by 2030.
    j. Conducting frequent training programs, and massive digital programs are two relatively simpler ways of generating large quantum of funds. With the deep expertise available in the institute, getting adequate takers should not be a problem.
    k. In this context, the RC has noted that in ISI some of the faculty members start earning revenue through external work, even without matching the bare minimum work norms. This should be discouraged. A faculty member should be allowed to receive a share in the earnings, if and only if he/she has met the basic work norms or has earned an annual revenue for the Institute that almost equals his/her annual salary.

l. Executive education is a key part of many institutions such as IIM today. ISI should think about how to make this a regular feature in the Institute. Appropriately high fees should be charged for such courses. Thus, the utility of such courses is two-fold: it makes money and also raises the learning levels overall. For example, many executives want to get one-week courses in data analytics; many government officers want to get better at data analytics. ISI could create courses on the government platform IGOT. Moreover, if industries are interested in sponsoring their employees to such courses, it would be a sign of usefulness of the courses. Also, this contact with industry and business should be exploited to seek feedback for revising the courses.

6.10.2 Tuition Fees

[Immediate]

- The increase in student strength and introduction of different academic programs has a budgetary impact on ISI given the current system. This impact on budget should be minimized as far as possible with the introduction of appropriate tuition fees for the existing programs at all levels starting from undergraduate to PhD programs.
    - The RC recommends that while all should pay tuition and other appropriate fees, those who have financial difficulty should apply to the Institute and the Institute should provide adequate support to such students.
    - Moreover, the Institute should explore alternate channels of admission of a small number of sponsored students from the academia, government and private sectors who pay much higher tuition and other fees, who are not provided any stipend or fellowship, but whose admission channels are easier. Once in the program, their effort to complete the program is the same as for any other student.
    - The revenue so earned may be used, *inter alia*, towards
        - Paying scholarship to those with financial hardship
        - Increasing the number of PhD students in the Institute
        - For development of the academic programs
    - Any new program must essentially be self-sustaining given the niche area the courses will address and the clientele who may be interested to hire these students. ISI already has a proven track record and the committee sees similar success in these specialized and unique programs.
    - The RC recommends that in order to recognize merit of only the most outstanding candidates, some special prizes may be awarded – a certificate, one-time cash award, and recognition should be sufficient.
    - The RC also recommends the Institute to initiate multiple Executive Development Programs that will serve not only the industry and government, but will also be a source for earning substantial revenue for the Institute.

6.10.3 Other Means of Resource Generation

Besides the above, the Institute may consider other sources of revenue generation through several other means like use of certain facilities of the Institute. IITs, for example, charge for the usage of high-end computation and other resources. Even faculty of the Institute pay for the use of such resources from their external grants. This is a common model in other Institutes that may be adopted in ISI as well. Such revenue generated should primarily be spent in the upkeep of the resource itself.

6.11 Recommendation XI – Leadership and Participation in Mega-Scale National Projects

[Short Term, Mid Term]

A general observation of the RC, after consultation with all the divisions, is that while a lot of excellence is there at individual levels, group level excellence is lacking. The exception has been the Cryptology group in ISI that has worked visibly and has thrived, leading to the establishment of the RC Bose Centre of Cryptology and Security. Barring a few exceptions, the Institute faculty members are not taking up, in large enough numbers, highly visible, large-scale projects cutting across the Institute. A few that could be found are the Technology Innovation Hub, the six Institute Systems Medicine Cluster targeted towards oral and cervical cancer and some reasonably large projects in SQC&OR. There may be a few more, but generally, most of the projects are small, individual based. The RC strongly believes that ISI should think big and not incremental. Some big-budget, national level service that ISI should aim at providing in future may be in the areas of:

- Theoretical foundation of Big Data Analysis,
- Predictive maintenance of army assets,
- Automation of court procedures for increasing efficiency and productivity of Indian courts and for reducing delays (even simple steps here could have noticeable impact since the problem of delays is immense here), and
- Statistical analysis of data collected by other government funded research institutes to extract maximum benefit and to introduce statistical planning of experiments, surveys etc.

6.12 Recommendation XII – Outreach to the Government

[Immediate, Short Term]

Given the importance of coordination with the government, the RC recommends that ISI must strengthen links to various government bodies including NITI. In particular, the Delhi Centre had close links with the erstwhile Planning Commission and now with NITI Aayog. In fact, Planning and Policy Research Unit (PPRU) was set up in the project mode with funding from NITI Aayog which helped build close links with the Economics and Planning Unit at ISI Delhi. Currently also, while some faculty members take up consulting positions with NITI Aayog, helping in policy formulation, a more formalised institute level agreement is desired such that NITI is able to call upon services of faculty members of ISI formally, while adequately compensating them for their time.

Introduction of internship modules with Government offices/Ministries that require heavy data modeling (for e.g., DIPAM, MoF) would also be beneficial. The RC believes that ISI should strive to become knowledge partners of NITI, several Ministries and departments in order to be useful to them in analyzing data for policy planning and reviews with a flow of funding benefitting both the Institute and the individual scientists.

The RC recommends that ISI should also reach out to the various research institutions of the CSIR, DST, DAE, ICMR etc. This is an action that may yield a bonanza of new research problems and opportunities. Each statistician/computer scientist should have a target of building a working relationship with one research institution during the next decade.

6.13 Recommendation XV– Outreach to the Industry

[Immediate, Short Term]

ISI is traditionally industry shy. In the areas of AI, ML, and DS, there is intense research action in companies such as Google, Microsoft, IBM, Facebook, Amazon, and the like. There is also lively work happening in start-ups. ISI must reach out to the industry and embrace start-up culture much more aggressively to find an outlet for their research. ISI students (M. Tech. and PhD) must be encouraged to spend internships in the industry. ISI should leverage their alumni who hold influential positions in the industry.

- Connecting with FICCI, CII, etc.: This becomes all the more necessary in today's connected world, more so to cater the competitive Indian industry. The committee recommends that a strong engagement model may be designed to collaborate with FICCI, CII and similar organizations to showcase the capability of the Institute. At the same time, joint conferences and sector-specific intensive workshops may be planned to rope in members of FICCI, CII etc.
- The C-CAIR of the Institute should be equipped to pro-actively engage with these industry bodies. Appropriate human resources need to be hired at C-CAIR who should speak the same language so that outreach through FICCI, CII, and similar organizations become effective. The committee feels because of the proximity of the SQC OR division with the industry, ideally a senior faculty of SQC & OR division should be given lead role in this endeavor and rather than waiting for these industry bodies and PSUs to come to ISI, the ISI should reach them quickly and fill the void that exists as of today.
- One clear advantage of campuses in Bengaluru, Chennai and Delhi is the nearness to industry. This makes interactions easier. Hence attempts must be made to use each campus to reach out to industry around that campus, more effectively.
- ISI need to involve "technology translators" at an early stage, i.e., entrepreneurs or companies that can convert the research technologies to commercial products. For example, IIT Bombay and IIT Patna have entered into joint research collaboration with Accenture for research in AI. This is another change that is needed to strengthen linkage with leading companies. This will also help students in acquiring industry-relevant skills.

6.14 Recommendation XIV – Alumni Connect

[Immediate, Short Term]

- This is traditionally a weak link for ISI and the primary reasons for this weak link are:
  - Lack of effort on part of the Institute to connect to the alumni
  - Small number of students produced by the Institute over the years.
- Creating the alumni connect has several advantages.
  - First the storehouse of knowledge, experience and good will existing with the alumni base often proves to be a great blessing for the Institute.
  - Second, since they are now looking at the Institute from outside, and have the opportunity to compare it with other institutes, its feedback is critical for course correction by the Institute
  - Finally, if the alumni are requested to fund specific endeavors by the Institute, where government funds are inadequate, the alumni have been known to oblige in large measures.

- The RC feels that the Institute should immediately set up an Alumni Cell, and make an attempt to:
    - Create the entire database of alumni and their current status
    - Reach out to the alumni on a regular basis, and keep them intimated about the developments in the Institute and making them stakeholders in the Institute
    - Take the help of the experts from the alumni base on many matters, e.g., course development, curricula development,
    - Seek their suggestions about ways to improve the Institute functioning
    - Seek their help in generation of corpus fund and in times of crisis
    - Highlight the achievements of the alumni, and celebrate it
    - Routinely invite alumni leaders for lecture session, policy planning and for co-investigation of important research and application problems.

A separate Office of *Dean of Alumni Affairs and International Relations* may be created with a senior faculty of the Institute leading it, to rope in the alumni in the development of the Institute. Till such a position is approved in the Council and the Regulations/Byelaws amended (this does not involve post creation or any new recruitment rules – hence should be relatively simpler), a Cell for Alumni and International Affairs should be internally created with a faculty as Head of that. Professional paid assistance must be sought so that this Cell/Office can reach its full potential. Very importantly, a set of about 10 students/scholars should be officially placed in the cell, who would hold position for one year, who will be tasked with maintaining alumni database, contacting them on a regular basis, and doing various implementation level tasks under the overall supervision of the Head/Dean.

6.15 Recommendation XV – Brand Building

[Short Term, Mid Term]

Brand building is also another way to reach out to the external world. The RC has already made some recommendations on this under the Section 6.9.2, ***Recommendation about Administrative Reforms.*** In addition, the faculty should be ever alert that the Institute brand name is propagated far and wide, through a variety of activities that they undertake regularly, or should start engaging in. For example, the various conferences, workshops and other meetings that the scientists attend are excellent opportunities, which should be consciously used to the full to spread *Brand ISI*. Ramping up engagement with the government and industry, and collaborating more with other institutions are also important steps in building the brand. In particular, the SQC & OR division should be mandated to contribute more towards propagating the ISI brand by exploring and engaging much more deeply and meaningfully with the industry.

6.16 Recommendation XVI – Grants-in-aid and Further Recommendation about Internal Revenue

[Immediate]

6.16.1 Grants-in-aid

- Having observed the funding pattern provided by the Government of India to the Institute over the years as Grants-in-aid, it is realized that the amount is barely enough to sustain the day-to-day activities of the Institute. Over the years, the funding has been enhanced only to the tune of factoring in the inflation. Thus, in effect, the funding from the government has effectively stagnated over the years.
- For enhancement of its various infrastructural resources, as well as for initiating a variety of development and futuristic programs, including adoption of digital technology at an Institute-wide scale, the Grants-in-aid must be enhanced significantly. It must be appreciated that in contrast to a single location institution, the fund requirements for a multi-locational institution like ISI is more. In fact, many centres of the Institute, e.g., in the North-East were opened on the instance of the government with the noble objective of serving specific regions of the country.
- It has been mentioned that because of lack of adequate funds, adequately protecting land in the Giridih campus with proper boundary wall, had to be postponed many times. Consequently, land encroachment has become a real problem in the Giridih land. Similarly, infrastructure at the Headquarters as well as in the Centres is not up to the mark. In fact, in places it is crumbling. Thus, a regular significant jump in the budget granted to the Institute seems to be in order.
- The RC recommends that the government may decide to have a policy of the usual budgetary enhancements of about 8-10% every year, and a 25% enhancement every fifth year. The Institute may then plan a large-scale up-gradation of resources every fifth year.
- At the same time, the contributions of this Institute to national development have been immense. It continues to play a major role in many policy-making exercises of the government. It produces limited but excellently trained human resources, who then join the academia and/or industry and/or government and this spreads the contribution of the Institute further. In fact, a large percentage of the students of the Institute go for research and then onto academia. They are placed in some of the top institutes around the globe and in the country.
- Thus, it becomes all the more important for the government to ensure the well-being of this internationally reputed institution, beyond just helping it to survive.

6.16.2 Adjustment of Internal Revenue from the Grants-in-aid

- The RC noted with consternation that much of the internal revenue generated by the Institute is deducted from the promised budget for the next Financial Year. The RC found this policy to be counterproductive and a disincentive for revenue generation.
- The RC unanimously and strongly recommends that this practice be stopped. The government should release the amount it has promised to the Institute in the BE, and not deduct the internal revenue generated in the previous year.
- The government may want to know the plan of the Institute for utilizing its internal revenue for the benefit of its activities. However, the government should not dictate what the Institute wants to do with its own revenue. The Council should be empowered to take that decision.
- It is also understandable that the government may not fund the activities that the Institute wishes to undertake from its internal revenue.

- However, under no circumstances should the government, as a matter of policy, simply reduce the internal revenue generated in any year from the Grants-in-aid released in any subsequent year.

6.17 Recommendation XVII – Computing Infrastructure

[Short Term to Mid Term]

It was clear from the interaction that the Institute as of now does not have a clear vision of the computing infrastructure that they should have in next 10 or 20 years. It is understandable that it is not always worth to plan beyond 10 years for computing infrastructure as the scenario is changing fast. One of the reasons that ISI is not crisp in planning computing infrastructure is the lack of high value data intensive projects that they are planning to execute. The requirement of in-house computing horse power vis-à-vis use of resources on the cloud needs to be studied, keeping in mind the inevitable increase in student intake as well as other futuristic activities. The corresponding budget needs to be planned and accounted for. All this need a detailed discussion. The RC recommends that a separate task force may be constituted involving a set of external experts to plan and design the computing resources for the Institute.

6.18 Recommendation XVIII – Laboratory Resources

[Short Term to Mid Term]

ISI researchers have explored developing laboratory facilities while it is understandable that ISI may not need lab facilities similar to a world-class technological institute. Rather the ISI labs should be more data focused and computationally involved rather than experiment centric equipment-based labs. However, two divisions in particular need equipment-based lab facilities to a large extent, especially to introduce post-graduate degree programs. They are:

i. Earth Sciences Group
ii. Biological Sciences Group

Both the above groups extensively depend on foreign research labs for analysis of their specimens/ samples. An important question in this context is to whether to build similar facility within the campus here in Kolkata or continue to depend on the outsourced lab services. The tapping of outsourced services has the advantage of getting best quality word-class services as and when needed, of course paying a premium. Development of a facility like that in ISI, with domain experts and their maintenance, may be a difficult proposition. Earth Sciences Group needs quantitative geology lab and well-equipped geochemical lab to design experiments in the field of sedimentology, palaeoclimate, palaeontology, petrology, tectonics and structural geology. Limited use of lab facilities of nearby institutions for geochemical analysis of specimens may be another option. For the use of other divisions, some of the specialized lab facilities that may be designed in-house could be:

- Time series Lab for applied Statistics group
- Optimization and Reliability Lab for SQC&OR Unit
- Nano Science Lab for Computer Sciences division
- Astrophysics Lab for Physics and Applied Math unit

- Quantum Computation Lab for Computer Sciences division
- Brain Science Lab for Computational Neuroscience Group

ISI North East Centre plans to develop a full-fledged lab for environmental studies, including clean room facility, computer laboratory, environmental chambers and sample storage facilities. A functional Fluvial Mechanics Laboratory is present in ISI Kolkata. The facility needs augmentation with instruments like Laser Doppler Anemometer (LDA), Particle image velocimetry (PIV), 3-D laser scanner (LS), and high-speed cameras for more accurate data recording and developing state-of-art models. Electro-mechanical Laboratory is one of the oldest units of ISI developed to fabricate mechanical computing machines. Since recent past, this laboratory is primarily used for training M. Tech. (QR&OR) students. However, both the electronics and mechanical labs requires significant modernization.

6.19 Recommendation XIX – General Infrastructure

[Mid Term to Long Term]

- The RC has heard multiple times from various stake holders that the infrastructure existing in the institute is not conducive to holding large classes, and for a variety of activities. Many more hostels are needed. Existing building needs massive repairs, renovation and maintenance in all campuses of the Institute at its various locations.
- The RC strongly urges the government to sanction a special grant of 100 Crores that will be used by the Institute in the next five to seven years for massive upgradation of all infrastructure.
- Besides academic infrastructure, Institute needs improved sports, recreational, and training infrastructure for its own human resource.
- Finally, RC recommends that the Institute plan for zero-emission/green campuses as part of the roadmap for infrastructure development.

6.20 Recommendation XX - Governance Structure of the Institute

[Immediate to Short Term]

Several stakeholders have drawn the attention of the RC to the unwieldy governance structure, detrimental to taking fast and difficult decisions, and also to the practice of widespread electioneering in the Institute.

6.20.1 Structure of ISI Council

- The RC observes that the ISI council has a large representation of members internal to ISI. There are
  - Seven elected Professors-in-Charge, Head SQC OR, representing each of the seven scientific divisions
  - Two elected representatives one each from a section of scientific workers and non-scientific workers
  - Dean of Studies is effectively an elected member.
  - Heads of Centres from Delhi, Bengaluru and Chennai, are members of the Council.

- Three general body representatives elected by the votes of general body members, one of whom is usually not a resident of West Bengal
    - These three have usually been retired faculty members/staff of ISI.

- Presence of thirteen employees of the Institute besides the Director, and three general body members with close ties with the Institute influences almost all discussions and decisions in the council in the light of the existing internal opinions.
- Inputs received by the RC from some external members of the Council seem to suggest that internal issues and interests overtake the visionary leadership role that the Council is expected to play, and status quo often becomes the only viable option.
- The RC realizes that having a Council as large as and with as many elected members as that in ISI puts in multiple checks and balances. The flip side is naturally that decision-making becomes almost impossible, if those decisions are not to the liking of even a few.
- The RC notes that the Council is usually a body comprising eminent academicians and other equally eminent members, and Chaired by a distinguished person. Thus, inherent trust in this body should be high. Having some checks and balances is necessary, but too much of it will essentially lead to throttling of major reforms.
- Thus, a MAJOR recommendation is the downsizing of the Council to 19 members as follows:
- Chairperson
- Government representatives (6)
    - Two representatives of the Nodal Ministry, Government of India, at the level of Joint Secretary and above, including the Financial Advisor
    - One representative of the Ministry of Finance, Government of India, at the level of Joint Secretary and above
    - One representative of the Ministry of Education, Government of India, at the level of Joint Secretary and above
    - One representative of the Department of Science and Technology
    - One representative of the Reserve Bank of India
- Scientists not employed in the Institute (6)
    - One representative of ICSSR not employed in the Institute
    - Three representatives from INSA not employed in the Institute, one in Mathematics, one in Statistics and one in Information Science
    - Two scientists co-opted by the Institute at a subsequent meeting from two different disciplines of Natural Sciences
- Elected representatives of the Institute members not employed in the Institute (2)
    - Two elected representatives of the Institute Members not employed in the Institute, one of whom must not ordinarily be a resident of West Bengal
- Elected representatives of the employees of the Institute (2)
    - Two elected representatives: one Scientific (considering all Scientific Workers including all faculty members) and one Non-scientific worker (considering all Non-Scientific Workers) of the Institute
- Ex-officio (2)
    - Director
    - Dean of Studies

- The Chief Executive (Administration and Finance) acts as the non-member Secretary of the Council.

- In addition, the RC suggests a layered architecture for forwarding agenda to the ISI Council, such that most of the agenda are routed through either
    - Finance Committee
    - Academic Council
    - Centre Heads for matters related to Centres
    - PinCs for matters related to academic activities of Divisions
- The RC also suggests that for specific matters pertaining to a Centre or to a Division, the Head of the Centre or the Professors-in-Charge of the Division/Head, SQC&OR should be invited to the Council for a discussion on that agenda.

- The electorate for the representative of scientific workers may be extended to include Professor, Associate Professor and their equivalent categories in addition to existing set of electorates.

6.20.2 Elections

- The RC strongly discourages the process of election in appointment of the Professors-in-Charge and Head SQC&OR Division, and the Dean of Studies.
- An Institute of National Importance should be concerned only with merit, and scientific and administrative ability, not with the capacity to win elections.
- The time wasted in electioneering and campaigning is undesirable for an Institute of this stature.
- The Professors-in-charge are expected to provide academic leadership to their Divisions. They also play the role of the Administrative Head of the Division.
- Hence, the Professors-in-charge should be selected through a duly constituted committee, as for selection of the Head of a Centre, not elected by votes. The Division may be empowered to nominate some names to the selection committee, though the selection committee would be free to consider other names as well.
- Similarly, a duly constituted selection committee should select the Dean. The faculty members would be free to submit nominations to the committee, if they so wish.
- The RC recommends that Council elections may be conducted for deciding on
    - One Representative of Scientific Workers
    - One Representative of Non-Scientific Workers
    - Two Representatives of the General Body employed in the Institute, one of whom must be from outside West Bengal
- Thus, the RC recommends that the present practice of election of
    - Seven Professors-in-charge/Head SQC&OR
    - Dean

  be discontinued henceforth.

- Besides these, the RC is aware that several other elections take place in the Institute. The RC desists from making any comments on those, leaving it to the judgment of the Institute and its Council. As the RC is most concerned about the scientific excellence of the Institute, it has focused only on elections dealing with scientific positions.

6.20.3 Powers to the Professors-in-Charge/Head SQC&OR

- All workers in the Division need to cooperate fully with the Professors-in-Charge/Head SQC&OR Division for smooth functioning of the divisional affairs, and in turn for smooth functioning of the Institutional affairs.
- The Professor-in-Charge/Head SQC&OR should have the authority to assign specific responsibilities to the faculty and non-faculty members of his/her division either on his/her own, or on the direction of the Director, Deputy Director, and Dean of Studies.
- In case a divisional worker fails to carry out the assigned duty, the Professor-in-Charge/Head SQC&OR Division will have the authority to officially seek explanation from the concerned worker. If dissatisfied with the response, the Professor-in-Charge/Head SQC&OR Division may forward the same to the higher authority, with his/her comments for further action as considered appropriate by the higher authority.
- Naturally, in an academic setting it is expected that all workers will extend full cooperation to the officer bearers of the Institute who are primarily responsible for the smooth functioning of the Institute and need for stern actions will be extremely rare.

6.21 Recommendation XXI – Greater Autonomy to the Institute in its Functioning

[Immediate to Short Term]

6.21.1 Alignment of Service Benefits with those of CFTIs

- It was observed by the RC that most of the grievances, be it from a scientific or a non-scientific worker, originate from the absence or denial of certain benefits common to workers of other Centrally Funded Technical Institutes (CFTIs) or the Central Government. It is also observed that such benefits are quickly extended to CFTIs belonging to Ministry of Education (erstwhile Ministry of Human Resource Development) as they have a large number of CFTIs under their umbrella. On the other hand, ISI being the lone academic institution under MoSPI, struggles with its nodal ministry for approval of the same benefits. Similar is the case of revision of stipends and PhD scholarship. Often such approvals have taken years to come. This naturally leads to disgruntlement and grievances among the affected set of workers and students. Moreover, the ISI administration, including the Director and the Council need to spend a lot of time and energy in engaging with the nodal ministry for the approvals.
- The committee carefully reviewed this, listened to presentation of workers' organization, and strongly recommends to the ministry to align all service-related benefits and perks, that are approved for the CFTIs by the Ministry of Education, to be automatically approved by MoSPI for ISI. Similarly, as and when Ministry of Education revises student stipends, fellowships and contingency grants for the CFTIs, that should automatically be approved by MoSPI for ISI. This will save a lot of workload and time for both MoSPI and ISI, time which can be spent productively on other meaningful endeavors.

6.21.2 Empowering the Council of the Institute

[Short Term to Mid Term]

The RC noted that although the Council of the Institute is the highest governing body of the Institute, it has limited powers beyond taking the academic and some internal administrative decisions. Currently, for almost all administrative matters and for all financial matters, the approval of the central government is sought.

The RC recommends that the Council should be further empowered to take certain administrative decisions especially those related to human resources including approving visiting, adjunct and similar faculty positions, as long as the overall financial implication is generally restricted to within the allotted budget. The Council should be empowered to frame rules to allow limited short-term scientific appointments at internationally competitive remunerations for up to a year. The Council should also be empowered to carry out periodic review of the staff structure in the Institute and make changes as per the evolving needs of the Institute within the strength approved for the Institute. Finally, the Council should also be empowered to decide whether to make a regular, deputation-based or contractual appointment against a regular post of the Institute, depending on the current requirements.

6.22 Recommendation XXII - Interaction with the Nodal Ministry

[Continuing]

The RC understands the importance of having close coordination between the Institute and the appropriate offices of the nodal ministry, so that matters are quickly resolved at the level of the government. For this, it is important that a small group in the Institute, that may include the Head of the Delhi Centre and one administrative officer in the Delhi Centre and also the Chief Executive (Administration and Finance), to act as liaison between the Institute and the nodal Ministry.

The RC recommends that a system of quarterly review meetings between ISI and the nodal ministry be established, where all pending issues are taken up regularly and resolved across the table as far as practical. The ministry officials should also pay an occasional visit to the Institute Headquarters and the main centres to be aware of the programs being undertaken by the Institute. This will bring in greater appreciation of each other's activities and a clearer understanding of each other's constraints.

6.23 Recommendation XXIII – Student Affairs

[Immediate to Short Term]

- All students and scholars who are getting stipends and scholarship should be mandatorily required to serve the Institute a specified number of hours every week, barring the weeks they have exams in the Institute and vacations.
- In particular, Research Scholars should be serving the Institute up to 8 hours a week. Similarly, M. Tech should be asked to serve up to 5 hours a week.
- A list of possible activities where scholar/student may assist the Institute should be defined. These could be:
    - As Teaching Assistant (TA) – In every course, for every 25 students, there should be one TA. Thus, a class of 50 students should have 2 TAs attached. The TAs assist the teacher in class, hands-on lab assignments, grading the assignments, and a variety of course-related jobs. A TA at

the Master's level may be asked to take at most 6 hours of lectures in a full course, while a TA at the PhD level may be asked to take at most 10 hours of lectures in a full course. TAs should deliver no more than 25% of the lectures in any course.

- Academic/technical service in the Dean's office, Website maintenance
- Assisting the office/cell of the Alumni Affairs
- Desk service in the library
- Technical service in the computer laboratories, etc.

- Students should create activity clubs related to activities like sports, music, dramatics, movie-club, art club, photography club, community engagement, event management, etc. While there will be no credit for this, participation and submission of report may be made mandatory. Institute should facilitate these activities to the maximum possible extent.

6.24 Recommendation XXIV – Training the Trainers

[Immediate to Short Term]

ISI is engaged in training the trainers program since its inception. ISI faculty members visit a number of organizations, both within India and abroad, to deliver contents to beginners and even to experts. However, it is evident from different indicators that there is a serious dearth of trained statisticians in the country, especially those who can usher in disruptive technology in the field of quantitative sciences. The RC feels that a more formal approach may be adopted in training the trainers program through a limited funding from the Institute's budget. A mentorship program for College and University teachers in Statistics and related disciplines may be introduced during summer where the teachers would be invited to spend at least two months in the Institute campus and a fellowship may be given to the teachers to cover their expenses due to travel and stay.

6.25 Recommendation XXV – Introduction of Chair Professor and Adjunct Faculty Positions

[Immediate to Short Term]

Positions of Chair Professor should be actively pursued with large corporate houses, government and alumni connect should act as a vital link in instituting these Chair Professorship. The representative of NITI Aayog to the Council of ISI has expressed to the RC that NITI can help the Institute raise a corpus, which can be used to initiate formal chair for funding visiting positions on Economics and Data Analytics to help carry out policy research. This position should offer remuneration at internationally competitive salaries to attract world known experts in Economics and Data Analysis for short visiting positions of up to one year.

In addition, the RC recommends that the Institute seeks special funds from the government, or builds a corpus from other sources, in order to fund adjunct faculty positions that will be for a semester to three years duration with remuneration packages significantly higher than for regular positions. The target would be to attract some of the best minds from across the world to teach and do research in ISI for shorter periods, and many of them may not be willing to move to regular positions in the Institute.

6.26 Recommendation XXVI – Better Welcome Package for New Faculty

[Immediate]

In order to remain competitive in this era or market-driven economies, the Institute should draw up attractive welcome package for the new faculty members, in line with those in IISc and IITs, to draw best talents to the Institute. In addition, it should pursue the corporate houses for additional top-up salary to new faculty to further attract them to ISI.

6.27 Recommendations at a Glance

The recommendations made in Sections 6.21 to 6.26 are summarized here, categorized as per their broad focus, for the convenience of the readers.

- Enhancing Productivity
  - Recommendation I: Renaming/reorganization/ restructuring the Scientific Divisions
  - Recommendation II: Creation/Continuation/Discontinuation of Research Centres for enhanced productivity and interdisciplinary work
  - Recommendation III: Faculty recruitment and promotion
- Human Resources: Recommended Strength and Distribution
  - Recommendation IV: Human Resources – Faculty and Non- faculty
- Enhancing Teaching/Training/Research Supervision Activities
  - Recommendation V: Teaching Activities
  - Recommendation VI: Adoption of digital mode for teaching and training
  - Recommendation VII: Research Supervision
- For Streamlining Administration
  - Recommendation VIII: Academic Administration
  - Recommendation IX: Administrative Reforms
- Fund Generation
  - Recommendation X – Revenue Generation, Course Fees and Universal Scholarship
- Greater Role in National Development
  - Recommendation XI - Leadership and Participation in Mega Scale National Projects
- Greater Engagement with the External World
  - Recommendation XII - Outreach to the government
  - Recommendation XIII - Outreach to the industry
  - Recommendation XIV - Alumni connect
  - Recommendation XV - Brand building
- Institutional Resources
  - Recommendation XVI – Financial Grants-in-aid and Further Recommendation about the Internal Revenue generation
  - Recommendation XVII - Computing infrastructure
  - Recommendation XVIII - Other laboratory resources
  - Recommendation XIX - General/Building infrastructure
- Governance
  - Recommendation XX - Governance Structure of the Institute

- Autonomy
    - Recommendation XXI - Greater autonomy to the Institute in its Functioning
- ToR(j) Report, examine and recommend on any other aspect considered relevant for effective and efficient functioning of the institute
    - Recommendation XXII - Interaction with Nodal Ministry
    - Recommendation XXIII –Student Affairs
    - Recommendation XXIV – Training the Trainers
    - Recommendation XXV – Introduction of Chair Professor
    - Recommendation XXVI – Better Welcome Package for New Faculty

Chapter 7

Concluding Remarks

The RC was formed at a time when covid-19 was making its presence felt internationally, but the pandemic wave was yet to start in India. Therefore, as would have been natural, the RC decided that it would visit the Headquarters and the main centres at least once before finalizing their report.

The target was to have several face-to-face meetings within the committee as well. However, just before the first meeting of the committee was scheduled in March 2020 in Kolkata, the entire country went into lockdown. The RC had to cancel its meeting as per the advisory by the ministry and waited for normalcy to resume in order to have the first physical meeting. Unfortunately, that never happened, and it came to such a pass that regretfully the RC had to accept that face-to-face meetings would need to be ruled out.

In such a situation, the RC did the best it could using digital medium, a poor substitute for physical meetings. In a series of meetings, it interacted with a large number of stakeholders, including the President of the ISI General Body and the Chairman of the Council. It also sought views of the external members of the Council through email. Finally, it had virtual tours of some of the facilities and campuses in Kolkata, Delhi, Bengaluru and Chennai through short video clips provided by the Institute authorities.

Through these meetings, the members of the RC and its subcommittees have exerted significant effort to understand the legacy of the Institute, the excellence that it embodies, its strengths and weaknesses, and the threats that it faces as well as the opportunities that are knocking its doors. Some of the glaring difficulties faced by the Institute are a suddenly imposed cap of the faculty strength, old and crumbling infrastructure, lack of space to grow, lack of enough state-of-the-art equipment and tight funding. The RC has made its best effort to put its recommendations such that these problems can be immediately alleviated, and over a period of time, fully addressed.

Nevertheless, the RC is also of the opinion that there is a lot more that the Institute can and should do in spite of the constraints that it faces. First and foremost of these is increasing the student strength substantially, to reach 3000 by 2030.

In order to do this, the Institute needs to enhance its teaching programs in all the disciplines that exist in the Institute. While doing so, the Institute has to be careful that each program that it offers has a large quantitative component to it, and also bears the signature of the Institute.

The RC noted that inertia coupled with an unwillingness to accept the practices being adopted elsewhere, and self-satisfaction are some of the problems that ail the system. Therefore, a large section of the faculty performs less than optimal institute service in terms of teaching, extra-mural funding, participation in large-scale mega projects, consultancy, Institute administration and organization of training programs. There are of course some outstanding persons in each division producing outstanding research. Needless to mention, these individuals bring great glory to themselves and also to the Institute. At the same time, to move from good to great, an Institute needs most of its workers to walk that extra mile, to put in that extra effort, to be continuously proactive than occasionally reactive.

The main issues that the RC wants to highlight are as follows:

- ISI should adopt digital technology in a big way to overcome the barriers of space and faculty constraints.
- ISI should undertake large, multidisciplinary work.
- The divisions in ISI should not compare within themselves. Comparison should be with the best institutions/department in the country and globally.
- Aspirations in ISI should not be tied to physical facilities – it is necessary to be part of the solution, not a part of the problem.

The Institute persists with the outdated notion of no tuition fees and stipend/scholarship for all. The consequence of this is smaller funds at the Institute's disposal through its own earnings that it could have used to improve its teaching and research infrastructure.

The demographic pattern, especially in Kolkata, is a matter of concern, robbing the institute of its All-India character, both in terms of its faculty strength and student strength. The Institute is aware of this problem. But ways of rectifying this quickly seem difficult to find. Presently, the approach to be adopted should be sufficient outreach, a conducive ecosystem, and high visibility that will attract good minds from all parts of the country.

Another matter of concern is the percentage of faculty in the Institute who hold at least one degree from the Institute. In the best places around the world, in-breeding is discouraged. However, a point to note is the problem in Statistics. Since few other institutions in India produce as good Statisticians as ISI does, it is natural that some of them would come back to the Institute to serve as members of the faculty. However, the same does not hold of the other disciplines like Mathematics, Computer Science, Economics, etc. where there are other institutions who also produce highly qualified individuals. Thus, barring Statistics, the Institute should strongly discourage in-breeding in other disciplines. Even in Statistics, the fresh recruits should be those who have gained at least three years of post-doctoral experience elsewhere.

Finally, ISI has over the years spread itself sub-optimally to a large number of locations. Strengthening all these locations simultaneously is practically infeasible. Since closing down different Centres is also a tall order, the RC feels that the Institute itself should define the major and minor strengths of the different Centres. For example, the Centre in the North-East might consider Environment Studies to be its major strength, while the branch in Giridih may consider Agriculture to be its major strength.

The RC has recommended some sweeping modifications to the existing structures in the Institute. The RC realizes that implementation of these changes may result in resistance and discontent. However, resistance to change is to be expected, and needs to be dealt with patiently and with understanding, but also with commitment to the timelines. It will also test the will power of the authorities competent to bring about the changes, as these are not only in the best interest of the Institute, but also in the best interest of the nation. A stronger Indian Statistical Institute will help build a stronger India.

Annexures

Annexure 1

The gazette notifications and subsequent notifications were published as follows:

- First principal notification was published vide Notification number S.O. 415(E) dated 2January, 2020
- First amendment to the principal notification was published vide Notification number S.O. 771(E) dated 20th February, 2020 - Amendment of the name of the Secretary of the committee
- Second amendment to the principal notification was published vide Notification number S.O. 2622(E) dated 5th August, 2020 – Extension of report submission date by six months
- Third amendment to the first amended notification was published vide notification no. S.O. 3567(E) dated 12th October, 2020 – Further amendment of the name of the Secretary of the committee
- Fourth amendment to the second amended notification was published vide Notification number S.O. 412(E) dated 28th January, 2021 – Extension of report submission date by six months beyond 27.01.2021

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भारत का राजपत्र
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असाधारण
EXTRAORDINARY

भाग **II**—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. **383]** नई दिल्ली, मंगलवार, जनवरी **28, 2020**/माघ 8, **1941**
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सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय

अधिसूचना

नई दिल्ली, 28 जनवरी, 2020

का.आ. 415(अ).—भारतीय सांख्यिकीय संस्थान अधिनियम, 1959 (1959 का संख्या 57) की धारा 9 की उप-धारा (1) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए केंद्र सरकार एतद् द्वारा भारतीय सांख्यिकीय संस्थान कोलकाता के लिए निम्नलिखित को शामिल करते हुए एक समीक्षा समिति का गठन करती है:

1.	डॉ .आर.ए .माशेलकर, राष्ट्रीय अनुसंधान प्रोफेसर; पूर्व महानिदेशक वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद; अध्यक्ष, भारतीय राष्ट्रीय विज्ञान अकादमी	-	अध्यक्ष
2.	डॉ. प्रणब सेन, भारत के पूर्व मुख्य सांख्यिकीविद; कंट्री डायरेक्टर, अंतर्राष्ट्रीय विकास केंद्र भारत कार्यक्रम	-	सदस्य
3.	प्रो .मनीन्द्र अग्रवाल, उप निदेशक, भारतीय प्रौद्योगिकी संस्थान कानपुर, कम्प्यूटर विज्ञान और इंजीनियरिंग विभाग	-	सदस्य
4.	सुश्री सुषमा नाथ, पूर्व वित्त सचिव, भारत सरकार; पूर्व सदस्य, **14**वां वित्त आयोग	-	सदस्य
5.	श्री आदिलजैनुलभाई, अध्यक्ष, भारत की गुणवत्ता परिषद; पूर्व अध्यक्ष, मैक्डिंज़े इंडिया	-	सदस्य
6.	डॉ .अनिल पी .गोरे, सिटेल भारत की सांख्यिकी सेवाओं के उपाध्यक्ष; पूर्व प्रोफेसर, सांख्यिकी, सावित्रीबाई फुले, पुणे विश्वविद्यालय	-	सदस्य
7.	श्री दीनानाथ खोलकर, उपाध्यक्ष और वैश्विक प्रमुख, एनालिटिक और इंटेलिजेंस, टाटा कंसल्टेन्सी सर्विसेज	-	सदस्य

8.	निदेशक, भारतीय सांख्यिकीय संस्थान	-	पदेन सदस्य
9.	सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय में भारतीय सांख्यिकीय संस्थान का कार्य देखने वाले महानिदेशक/अपर महानिदेशक	-	पदेन सदस्य
10.	मानव संसाधन विकास मंत्रालय के उच्च शिक्षा विभाग में विश्वविद्यालय अनुदान आयोग / केंद्रीय विश्वविद्यालयों की गतिविधियों के प्रभारी अपर सचिव/संयुक्त सचिव	-	पदेन सदस्य
11.	सांख्यिकी और सूचना प्रबंधन विभाग के प्रभारी अधिकारी, भारतीय रिजर्व बैंक	-	पदेन सदस्य
12.	श्री आरअग्रवाल .सी., उप महानिदेशक (सेवानिवृत्त), सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय	-	सचिव

2. उक्त समिति के विचारार्थ विषय निम्नवत हैं:

   क) राष्ट्रीय महत्व के संस्थान के रूप में अपने उद्देश्यों को पूरा करने में भारतीय सांख्यिकीय संस्थान की वर्तमान (आईएसआई) स्थिति की समीक्षा करना।

   ख) पिछले प्रभागों के कार्यनिष्पादन की समीक्षा करना/विभागों/वर्षों के दौरान संस्थान की विभिन्न इकाईयों 10।

   ग) प्रवेश, पाठ्यक्रम विषयवस्तु, मूल्यांकन, शुल्क,प्रोत्साहन संबंधी नीति, आदि सहित संस्थान के गैरअनुसंधान शैक्षणिक - कार्यक्रमों की समीक्षा करना।

   घ) देश के भीतर तथा बाहर शैक्षणिक संस्थाओं के साथ सहयोग सहित संस्थान की अनुसंधान गतिविधियों/उपलब्धियों के विस्तार (स्पेक्ट्रम) की समीक्षा करना ।

   ङ) देश के आर्थिक और सामाजिक विकास की आवश्यकताओं की पूर्ति तथा सांख्यिकी और विश्लेषणात्मक कार्मिकों के लिए आपूर्तिमांग अंतराल को दूर करने हेतु देश की सरकार-, उद्योग और अन्य संगठनों के साथ परस्पर विचार विमर्शसहयोग की / उसकी तीव् विस्तार औररता की समीक्षा करना ।

   च) संस्थान के सर्वसमावेशी शासन विधि और प्रशासनिक ढांचें तथा व्यवस्था में विभिन्न शासी और प्रशासनिक संस्थाओं के बीच के अंतरसंबंधों की समीक्षा करना ।

   छ) सरकार से अनुदान, राजस्व सृजन गतिविधियां, और उपलब्ध भौतिक परिसंपत्तियां- जैसे संस्थान की गतिविधियों के लिए भूमि, भवन, उपकरण सहित संस्थान के वित्तीय स्रोतों की समौचित्य का मूल्यांकन करना ।

   ज) भारतीय सांख्यिकीय संस्थान अधिनियम,और इसके संस्थापन प्रलेख मे किसी भी संशोधन की आवश्यकता की जांच 1959 करना।

   झ) उपर्युक्त पहलुओं की समीक्षा के आलोक में, संस्थान को देश के सामाजिक और आर्थिक विकास संबंधी आवश्यकताओं को पूरा करने में और अधिक महत्वपूर्ण भूमिका निभाने में सक्षम बनाने के लिये संसाधनों की आवश्यकता सहित पुनर्व्यवस्था / पुनर्गठन के लिये उपयुक्त उपायों की सिफ़ारिश करना ।

   ञ) संस्थान द्वारा प्रभावशाली और कुशलतापूर्वक कार्य करने के लिए अन्य सुसंगत पहलुओं का विवरण देना, उनकी जांच और अनुशंसा करना ।

3. भारतीय सांख्यिकीय अधिनियम) की उप धारा 9 की धारा 19592) के उपबंधों के अनुसरण में संस्थान को समिति के गठन की सूचना दे दी गई है ।

4. समिति अपने कार्य की प्रक्रिया स्वयं तय कर सकती है । आवश्यकतानुसार यह अपने सदस्यों के बीच से ही उपसमितियों का गठन कर - सकती है और विचारार्थ विषयों के संबंध में किसी भी बिन्दु पर, यथावश्यक रूप से, देश के अंदरया देश के बाहर के परामर्शी या सुविज्ञ से सलाह ले सकती है ।

5. समिति इस अधिसूचना के जारी होने की तारीख से छह महीने के भीतर अपनी रिपोर्ट प्रस्तुत करेगी ।

6. समिति को सचिवीय सहायता सांख्यिकीय संस्थान द्वारा प्रदान की जाएगी और समिति का मुख्यालय नई दिल्ली में होगा ।

[फा.सं. I-12011/16/2014-आईएसआई]

के. एस. रेजिमोन, उप महानिदेशक

MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION

NOTIFICATION

New Delhi, the 28th January, 2020

S.O. 415(E).—In exercise of the powers conferred by sub-section (1) of Section 9 of the Indian Statistical Institute Act, 1959 (57 of 1959), the Central Government hereby constitutes a Review Committee for the Indian Statistical Institute, Kolkata with the following composition:

1.	Dr. R.A. Mashelkar, National Research Professor; former Director General of Council of Scientific and Industrial Research; President, Indian National Science Academy	-	Chairman
2.	Dr. Pronab Sen, Ex-Chief Statistician of India; Country Director, International Growth Centre India Programme	-	Member
3.	Prof. Manindra Agrawal, Deputy Director, IIT Kanpur, Department of Computer Science and Engineering	-	Member
4.	Ms. Sushma Nath, Ex-Finance Secretary, Government of India; Ex-Member, 14th Finance Commission	-	Member
5.	Shri Adil Zainulbhai, Chairman, Quality Council of India; Ex-Chairman, McKinsey India	-	Member
6.	Dr. Anil P Gore; Vice-President of Statistical Services, Cytel, India, ex-Professor of Statistics, Savitribai Phule Pune University	-	Member
7.	Shri Dinanath Kholkar, Vice President and Global Head of Analytics and Intelligence, Tata Consultancy Services	-	Member
8.	Director, Indian Statistical Institute	-	Ex-officio Member
9.	Director General/Additional Director General dealing with Indian Statistical Institute in Ministry of Statistics & Programme Implementation	-	Ex-officio Member
10.	Additional Secretary/Joint Secretary in-charge of activities of University Grants Commission/Central Universities in Department of Higher Education, Ministry of Human Resource Development	-	Ex-officio Member
11.	Officer in-charge of Department of Statistics and Information Management, Reserve Bank of India	-	Ex-officio Member
12.	Shri R.C. Aggarwal, Deputy Director General (Retired), Ministry of Statistics & Programme Implementation	-	Secretary

2. The Terms of Reference of the said Committee are as follows:

a) to review the present status of Indian Statistical Institute (ISI) in fulfillment of its objectives as an institute of national importance.

b) to review the performance of various units/departments/divisions of the Institute during the last 10 years.

c) to review the non-research academic programmes of the Institute, including admissions, course contents, evaluation, fees, incentivisation policy, etc.

d) to review the spectrum of research activities/achievements of the Institute, including collaboration with academic institutes within and outside the country.

e) to review the extent and intensity of interaction/collaboration with Government, industry and other organizations in the country, in contributing to country's economic and social development needs as also for meeting the supply demand gap for statistical and analytical personnel.

f) to review the overall governance and administrative structure of the Institute and inter-relationships between the different governing and administrative entities in the system.

g) to assess the adequacy of the Institute's financial resources, including grants from Government, revenue generation activities, and available physical assets – like land, buildings, equipment, for Institute's activities.

h) to examine the need for any amendments to the Indian Statistical Institute Act, 1959 and it's Memorandum of Association.

i) in light of the review of the above aspects, to recommend suitable measures, as also reorganization/restructuring, including the requirement of resources, to enable the Institute to play a more effective role in serving the economic and social development needs of the country.

j) to report, examine and recommend on any other aspect considered relevant for effective and efficient functioning of the Institute.

3. In accordance with the provisions of Sub-section (2) of Section 9 of the Indian Statistical Institute Act, 1959, the Institute has been informed about the setting up of the Committee.

4. The Committee may settle its own procedure of work. It may appoint such sub-committees as it may consider necessary from amongst its members and may take the advice of the consultants and experts on any point on matter arising out of its terms of reference from within the country or outside, as it may deem necessary.

5. The Committee shall submit its report within six months from the date of issue of this Notification.

6. Secretarial assistance to the committee shall be rendered by Indian Statistical Institute and the headquarters of the Committee will be at New Delhi.

[F. No. I-12011/16/2014-ISI]

K.S. REJIMON, Dy. Director General

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असाधारण
EXTRAORDINARY

भाग **II**—खण्ड 3—उप-खण्ड **(ii)**
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 702] नई दिल्ली, बृहस्पतिवार, फरवरी **20, 2020**/फाल्गुन **1, 1941**
No. 702] **NEW DELHI, THURSDAY, FEBRUARY 20, 2020/PHALGUNA 1, 1941**

सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय

अधिसूचना

नई दिल्ली, 20 फरवरी, 2020

का.आ. 771(अ).— भारतीय सांख्यिकी संस्थान अधिनियम, 1959 (1959 का 57) की धारा 9 की उप-धारा (1) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए केंद्र सरकार, भारतीय सांख्यिकीय संस्थान, कोलकाता के लिये समीक्षा समिति का गठन करने हेतु दिनांक 29 जनवरी, 2020 को भारत के राजपत्र के असाधारण अंक के भाग II, खंड 3 में प्रकाशित केंद्र सरकार की अधिसूचना सं. का.आ. 415(अ) दिनांक 28 जनवरी, 2020 में एतद्वारा निम्नलिखित संशोधन करती है:—

उक्त अधिसूचना में उसके पैरा 1 के क्रम सं. 12 के समक्ष निम्नलिखित को प्रतिस्थापित किया जाएगा:—

12.	श्री कृष्ण चंदर, उप महानिदेशक (सेवानिवृत्त), सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय	-	सचिव

[फा.सं. आई-12011/16/2014-आईएसआई]

के. एस. रेजिमोन, उप महानिदेशक

नोट: मुख्य अधिसूचना दिनांक 29 जनवरी, 2020 को सं. का.आ. 415(अ) द्वारा प्रकाशित की गई थी।

MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION

NOTIFICATION

New Delhi, the 20th February, 2020

S.O. 771(E).—In exercise of the powers conferred by sub-section (1) of Section 9 of the Indian Statistical Institute Act, 1959 (57 of 1959), the Central Government hereby makes the following amendment to

the notification of the Central Government number S.O. 415(E) dated 28th January, 2020 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii) dated the 29th January, 2020 constituting a Review Committee for the Indian Statistical Institute, Kolkata, namely:-

In the said notification, for serial no. 12 of paragraph 1 thereof, the following shall be substituted, :-

12.	Shri Krishan Chander, Deputy Director General (Retired), Ministry of Statistics & Programme Implementation	—Secretary

[F. No. I-12011/16/2014-ISI]

K.S. REJIMON, Dy. Dir. General

Note: The principal notification was published *vide* number S.O. 415(E) dated 29th January, 2020.

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असाधारण
EXTRAORDINARY
भाग **II**—खण्ड 3—उप-खण्ड **(ii)**
PART II—Section 3—Sub-section (ii)
प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. **2324]** नई दिल्ली, बृहस्पतिवार, अगस्त **6, 2020**/श्रावण 15**, 1942**
No. 2324] **NEW DELHI, THURSDAY, AUGUST 6, 2020/SRAVANA 15, 1942**

सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय

अधिसूचना

नई दिल्ली, 5 अगस्त, 2020

का.आ. 2622(अ).—भारतीय सांख्यिकी संस्थान अधिनियम, 1959 (1959 का 57) की धारा 9 की उप-धारा(1) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, केंद्र सरकार ने भारत के राजपत्र, असाधारण, भाग II, की धारा 3 की उपधारा (ii) में प्रकाशित दिनांक 28 जनवरी, 2020 की अधिसूचना एस.ओ. 415 (ई) और भारत के राजपत्र असाधारण, भाग II, धारा 3, उप-धारा (ii) में प्रकाशित दिनांक 20 फरवरी, 2020 की अधिसूचना एस.ओ. 771(ई) के अनुवर्ती संशोधन द्वारा एक समिति का गठन किया गया था ।दिनांक 28.01.2020 की मुख्य अधिसूचना के पैरा 5 के अनुसार समिति को अधिसूचना की तारीख के छह महीनों के अंदर अपनी रिपोर्ट प्रस्तुत करनी थी ।उक्त समिति द्वारा रिपोर्ट प्रस्तुत करने की तारीख को एतद्वारा 27.07.2020 से आगे के छह महीनों तक उन्हीं निबंधन व शर्तों पर आगे बढ़ाया जाता है ।

[फा.सं.आई-12011/16/2014-आईएसआई]

चन्द्रदीप कुमार झा, उप महानिदेशक

टिप्पणी: मुख्य अधिसूचना दिनांक 28 जनवरी, 2020 के का.आ. 415(अ) द्वारा की गयी थी ।

MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION

NOTIFICATION

New Delhi, the 5th August, 2020

S.O 2622(E).—In exercise of the powers conferred by sub-section (1) of Section 9 of the Indian Statistical Institute Act, 1959 (57 of 1959), the Central Government had constituted a committee vide Notification S.O. 415(E) dated 28th January, 2020 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii), and subsequent amendment vide Notification S.O. 771 (E) dated 20th February, 2020 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii). As per para 5 of the principal notification dated 28.01.2020, the committee had to submit its Report within Six Months from the date of its notification. The date of submission of report by the said committee is hereby extended for six months beyond 27.07.2020 on the same terms and conditions.

[F. No.I-12011/16/2014-ISI]

CHANDRADEEP KUMAR JHA, Dy. Director General

Note: The principal notification was vide number S.O. 415(E) dated 28th January, 2020.

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असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 3155] नई दिल्ली, मंगलवार, अक्तूबर 13, 2020/आश्विन 21, 1942
No. 3155] NEW DELHI, TUESDAY, OCTOBER 13, 2020/ASVINA 21, 1942

सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय

अधिसूचना

नई दिल्ली, 12 अक्तूबर, 2020

का.आ. 3567 (अ).- भारतीय सांख्यिकी संस्थान अधिनियम, 1959 (1959 का 57) की धारा 9 की उप-धारा (1) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए केंद्र सरकार द्वारा भारत के राजपत्र, असाधारण, भाग II, धारा 3, उपधारा (ii) में प्रकाशित अधिसूचना सं. का. आ. 415 (अ) दिनांक 28 जनवरी के माध्यम से एक समीक्षा समिति का गठन किया गया था। तत्पश्चात भारत के राजपत्र, असाधारण, भाग II, धारा 3, उपधारा (ii) में प्रकाशित अधिसूचना सं. का. आ. 771 (अ) दिनांक 20 फरवरी, 2020 के द्वारा का. आ. 415 (अ) दिनांक 28 जनवरी, 2020 के पैरा 1 के क्र. सं.12 में श्री आर. सी. अग्रवाल के स्थान पर श्री कृष्ण चंदर, उप महानिदेशक (सेवानिवृत्त), सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय का नाम, शामिल करने के लिये उक्त अधिसूचना में संशोधन किया गया। तत्पश्चात भारत के राजपत्र, असाधारण, भाग II, धारा 3, उप-धारा (ii) में प्रकाशित अधिसूचना सं. का. आ. 2622 (अ) दिनांक 5 अगस्त, 2020 के माध्यम से समीक्षा समिति की अवधि 27.07.2020 के बाद से छह महीने आगे बढाने के लिये अधिसूचना सं. का. आ. 415 (अ) दिनांक 28 जनवरी मे पुनः संशोधन किया गया।

2. अब, अधिसूचना सं. का. आ. 415 (अ)दिनांक 28 जनवरी, 2020 के पैरा 1 के क्र. सं.12 पर श्री कृष्ण चंदर के नाम की जगह पर श्री अतनु कुमार चौधरी, उप महानिदेशक, वाणिज्यिक जानकारी एवं सांख्यिकी महानिदेशालय, वाणिज्य और उद्योग मंत्रालय, कोलकाता, का नाम होगा।

[फा. सं. आई-12011/16/2014-आई एस आई]

चंद्रदीप कुमार झा, उप महानिदेशक

4865 GI/2020

नोट : मुख्य अधिसूचना दिनांक 29 जनवरी 2020 को संख्या का. आ. 415 (अ)द्वारा, मुख्य अधिसूचना पर प्रथम संशोधन अधिसूचना संख्या का. आ. 771 (अ) दिनांक 20 फरवरी, 2020 को तथा द्वितीय संशोधन अधिसूचना संख्या का. आ. 2622 (अ) दिनांक 5 अगस्त, 2020 को प्रकाशित की गई थी।

MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION

NOTIFICATION

New Delhi, the 12th October, 2020

S.O 3567 (E).——In exercise of the powers conferred by sub-section (1) of Section 9 of the Indian Statistical Institute Act, 1959 (57 of 1959), the Central Government had constituted a Review Committee vide Notification No. S.O. 415(E) dated 28th January, 2020 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii). Subsequent amendment to the said Notification was made vide Notification number S.O. 771(E) dated 20th February, 2020 for inclusion of name of Shri Krishan Chander, Deputy Director General (Retired), Ministry of Statistics & Programme Implementation in place of Shri R. C. Aggarwal at Sl. No. 12 of paragraph 1 of the Notification No. S.O. 415(E) dated 28th January, 2020. Further amendment to the original Notification for extending the tenure of Review Committee for six months beyond 27.07.2020 was made vide Notification No. S.O. 2622(E) dated 5th August, 2020 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii).

2. Now, name of Shri Atanu Kumar Chowdhury, Deputy Director General, Directorate General of Commercial Intelligence and Statistics, Ministry of Commerce and Industry, Kolkata shall be included at Sl. No. 12 of para 1 of the Notification S.O. 415(E) dated 28th January, 2020 replacing Shri Krishan Chander.

[F. No.I-12011/16/2014-ISI]
CHANDRADEEP KUMAR JHA, Dy.` Director General

Note: The principal notification was published vide Notification number S.O. 415(E) dated 28th January, 2020, first amendment to the principal notification was published vide Notification number S.O. 771(E) dated 20th February, 2020 and second amendment to the principal notification was published vide Notification number S.O. 2622(E) dated 5th August, 2020.

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असाधारण
EXTRAORDINARY

भाग **II**—खण्ड **3**—उप-खण्ड **(ii)**
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. **375]** नई दिल्ली, बृहस्पतिवार, जनवरी 28, **2021**/माघ 8, **1942**
No. 375] **NEW DELHI, THURSDAY, JANUARY 28, 2021/MAGHA 8, 1942**

सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय

अधिसूचना

नई दिल्ली, 28 जनवरी, 2021

का.आ. 412(अ).— भारतीय सांख्यिकी संस्थान अधिनियम, 1959 (1959 का 57) की धारा 9 की उप-धारा (1) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए केंद्र सरकार ने भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखण्ड (ii) में प्रकाशित दिनांक 28 जनवरी, 2020 की अधिसूचना संख्या का.आ. 415 (अ) के द्वारा एक समीक्षा समिति का गठन किया था । उक्त अधिसूचना में दिनांक 20 फ़रवरी,2020 के का.आ. 771(अ) द्वारा अनुवर्ती संशोधन किया गया जो दिनांक 28 जनवरी, 2020 की अधिसूचना संख्या का.आ. 415(अ) के पैरा 1 के क्रम स. 12 पर श्री आर.सी.अग्रवाल के स्थान पर श्री कृष्ण चंदर, उप महानिदेशक (सेवानिवृत, सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय का नाम शामिल करने के लिए था । इसके अतिरिक्त, मूल अधिसूचना में दिनांक 27.07.2020 से परे छह महीने के लिए समीक्षा समिति के कार्यकाल का विस्तार करने के लिए संशोधन दिनांक 5 अगस्त, 2020 की अधिसूचना संख्या का.आ. 2622(अ) द्वारा किया गया जिसे भारत के राजपत्र, असाधारण, भाग II, खंड 3, उप-खंड (ii) में प्रकाशित किया गया था । इसके अलावा, दिनांक 12 अकटूबर, 2020 की अधिसूचना संख्या का.आ. 3567 (अ) के द्वारा नया संशोधन किया गया जो दिनांक 20 फरवरी, 2020 की संशोधित अधिसूचना सं का.आ. 771 (अ) के पैरा 1 की क्रम संख्या 12 पर उल्लिखित श्री कृष्ण चंदर के स्थान

पर श्री अतनु कुमार चौधरी, उप महानिदेशक,वाणिज्यिक आसूचना और सांख्यिकी महानिदेशालय, वाणिज्य और उद्योग मंत्रालय, कोलकाता का नाम शामिल करने के लिए था ।

2. दिनांक 05.08.2020 की संशोधित अधिसूचना के पैरा 5 के अनुसार, समिति द्वारा रिपोर्ट प्रस्तुत करने की तिथि उन्हीं निबंधन और शर्तों पर दिनांक 27.07.2020 से परे छह महीने के लिए बढ़ा दी गई थीं । अतः, उक्त समिति द्वारा रिपोर्ट प्रस्तुत करने की तिथि उन्हीं निबंधन और शर्तों पर एतद्वारा दिनांक 27.01.2021 से परे और छह महीने के लिए बढ़ा दी गई है ।

[फ़ा.सं. I-12011/16/2014-आइएसआइ]

चन्द्रदीप कुमार झा, उप महानिदेशक

नोट: प्रमुख अधिसूचना दिनांक 28 जनवरी, 2020 की अधिसूचना संख्या का.आ. 415 (अ) द्वारा प्रकाशित की गई थी, प्रमुख अधिसूचना में पहला संशोधन दिनांक 20 फरवरी, 2020, की अधिसूचना संख्या का.आ. 771 (अ) द्वारा प्रकाशित किया गया था, प्रमुख अधिसूचना में दूसरा संशोधन दिनांक 5 अगस्त, 2020 की अधिसूचना संख्या का.आ. 2622 (अ) द्वारा प्रकाशित किया गया था और पहली संशोधित अधिसूचना में तीसरा संशोधन दिनांक 12 अक्टूबर, 2020 की अधिसूचना संख्या का.आ. 3567 (अ) द्वारा प्रकाशित किया गया था ।

MINISTRY OF STATISTICS AND PROGRAMME IMPLEMENTATION

NOTIFICATION

New Delhi, the 28th January, 2021

S.O. 412 (E).—In exercise of the powers conferred by sub-section (1) of Section 9 of the Indian Statistical Institute Act, 1959 (57 of 1959), the Central Government had constituted a Review Committee vide Notification No. S.O. 415(E) dated 28th January, 2020 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii). Subsequent amendment to the said Notification was made vide Notification number S.O. 771(E) dated 20th February, 2020 for inclusion of name of Shri Krishan Chander, Deputy Director General (Retired), Ministry of Statistics & Programme Implementation in place of Shri R. C. Aggarwal at Sl. No. 12 of paragraph 1 of the Notification No. S.O. 415(E) dated 28th January, 2020. Further amendment to the original Notification for extending the tenure of Review Committee for six months beyond 27.07.2020 was made vide Notification No. S.O. 2622(E) dated 5th August, 2020 published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (ii). Furthermore, a new amendment was made vide Notification No. S.O. 3567(E) dated 12th October, 2020 for inclusion of name of Shri Atanu Kumar Chowdhury, Deputy Director General, Directorate General of Commercial Intelligence and Statistics, Ministry of Commerce and Industry, Kolkata in place of Shri Shri Krishan Chander at Sl. No. 12 of paragraph 1 of the revised Notification No. S.O. 771(E) dated 20th February, 2020.

2. As per para 5 of the revised notification dated 05.08.2020, the date of submission of report by the Committee was extended for six months beyond 27.07.2020 on the same terms and conditions. Now, the date of submission of report by the said committee is hereby extended for another six months beyond 27.01.2021 on the same terms and conditions.

[F. No.I-12011/16/2014-ISI]

CHANDRADEEP KUMAR JHA, Dy. Director General

Note: The principal notification was published vide Notification number S.O. 415(E) dated 28th January, 2020, first amendment to the principal notification was published vide Notification number S.O. 771(E) dated 20th February, 2020 , second amendment to the principal notification was published vide Notification number S.O. 2622(E) dated 5th August, 2020 and third amendment to the first amended notification was published vide notification no. S.O. 3567(E) dated 12th October, 2020.

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SURENDER MAHADASAM

Annexure 2

Subcommittees Formed by the Review Committee

Subcommittee 1 – On Research Excellence & Relevance

Group 1: Stat, Math, SQC&OR, Official Statistics, Computer Science

Anil P. Gore (Group Chair), Atanu Kumar Chowdhury (Convener)

RC Members:

- Manindra Agrawal, Adil Zainulbhai, Dinanath Kholkar, A. R. Joshi,

External Members:

- Rahul Mukherjee, FNA, FASc, FNASc
  National Science Chair and Former Professor
  Indian Institute of Management Calcutta
- Mahan Maharaj, FNA
  TIFR Mumbai
- Y. Narahari, FNA, FASc, FNAE, FNASc, FIEEE
  Professor of Computer Science and Automation
  Indian Institute of Science, Bengaluru
- PP Chakrabarti, FNA, FASc, FNAE, FNASc
  Professor of Computer Science
  Former Director
  IIT Kharagpur
- Biraja Ghoshal
  Tata Consultancy Services

Group 2: Social Sciences including Economics, Sociology, Linguistics, Psychology Research, Population Studies

Pronab Sen (Group Chair), Atanu Kumar Chowdhury (Convener)

RC Members:

- Sushama Nath

External Members:

- Pushpak Bhattacharyya, FNAE
  Professor of Computer Science
  IIT Bombay
  Former Director, IIT Patna
- Seema Mehrotra
  Professor and Head of the Department, Clinical Psychology
  NIMHANS, Bengaluru

Group 3: Natural Sciences

Manindra Agrawal (Group Chair), Atanu Kumar Chowdhury (Convener)

RC Members:
- Anil P. Gore

External Members:
- Alok Bhattacharyya, FNA, FASc
  Professor of Biology
  Ashoka University
  Formerly Professor, JNU
- Chandrima Shaha, FNA, FASc, FNASc, FTWAS
  President, INSA
  Professor of Eminence
  Former Director
  National Institute of Immunology
- Ajay Sood, FRS, FNA, FASc, FNASc, FTWAS
  Distinguished Honorary Professor of Physics
  Indian Institute of Science, Bangalore
- Pulak Sengupta, FNA, FASc
  Professor of Geology
  Jadavpur University
- Ajit Kembhavi, FASc, FNASc
  Professor Emeritus
  Former Director
  Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune

Subcommittee 2 – Teaching & Training

Anil P. Gore (Subcommittee Chair), Abhay Bhatt (Convener)

RC Members:
- Manindra Agrawal, Dinanath Kholkar

External Members:
- G. Rangarajan, FASc, FNASc
  Director and Professor of Mathematics
  Indian Institute of Science, Bangalore
- Subhasis Chaudhuri, FNA, FASc, FNASc, FNAE, FIEEE
  Director and Professor of Electrical Engineering
  IIT Bombay
- Dr. Prithwis De
  Tata Consultancy Services

Subcommittee 3 - Resources

Sushama Nath (Group Chair), Madan Mohan Hasija (Convener)

RC Members:

- Pronab Sen, Adil Zainulbhai, Dinanath Kholkar, A. R. Joshi

External Members:

- Vijay Chandru, FASc
  Adjunct Faculty, Indian Institute of Science, Bangalore
  Founder Director, Strand Life Sciences
- Pratik Pal
  Chief Executive Officer, Tata Digital
- Sudipta Ghosh
  Partner, Data and Analytics Leader
  PwC India
- Somnath Ganguly
  Tata Consultancy Services

Subcommittee 4 - Governance

Pronab Sen (Group Chair), A.R. Joshi (Convener)

RC Members:

- Sushama Nath, Adil Zainulbhai, Dinanath Kholkar, Madan Mohan Hasija

External Members:

- Arabinda Mitra
  Scientific Secretary
  Office of the PSA, New Delhi
- Indranil Manna
  Professor of Metallurgical and Materials Engineering
  Vice Chancellor, BIT Mesra and Former Director IIT Kanpur
  (On lien from IIT Kharagpur)